DOCUMENT RESUME

ED 063 575 24 CS 000 003

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TITLE Changes in Reading Achievement, Perceptual Motor Ability, and Behavior Adjustment as a Function of Perceptual Motor Training and Individualized Remedial Reading Instruction. Final Report.
INSTITUTION Wisconsin Univ., Stevens Point. Dept. of Psychology.
SPONS AGENCY Office of Education (DHEW), Washington, D.C. Bureau of Research.
BUREAU NO BR-0-E-104
PUB DATE Feb 72
GRANT OEG-5-70-0035
NOTE 89p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Behavior Change; Correlation; Elementary School Students; *Individualized Instruction; *Perceptual Motor Learning; *Reading Achievement; *Reading Instruction; Reading Research; *Remedial Reading

ABSTRACT

Forty-four 7-11 year-old subjects with normal to high IQ's but who fell in the lower half of their respective age groups in reading were studied to determine the relative effectiveness of perceptual motor training (PMT) and individualized remedial reading instruction (IRRI) upon the reading achievement, perceptual motor development, and behavior adjustment of children with reading problems. Other objectives included an examination of transfer effects of perceptual motor training on reading achievement, an analysis of characteristics of children likely to experience success under a given treatment, and an analysis of the relationships among the variables studied. Ranked by age and reading achievement, subjects were randomly assigned to three treatment groups: PMT, IRRI, and general activity (placebo control). Training consisted of five 35-minute sessions per week for six months, and pre- and post-tests were administered. Conclusions derived from an analysis of the data are: (1) PMT did not transfer to reading performance, (2) long term IRRI was more effective than PMT in developing reading achievement and adjustable school behavior. (Included are numerous references and appendices containing the school behavior profile, sample teacher daily logs, and means and standard deviations for all variables.) (Author/RD)

PA-24

ED 063575

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February, 1972

U.S. Department of
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The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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SUMMARY

The purpose of this study was to determine the relative effectiveness of perceptual motor training and individualized remedial reading instruction on the reading achievement, perceptual motor development, and behavior adjustment of children with reading problems. Additional objectives included an examination of the transfer effects of perceptual motor training on reading achievement, as well as an analysis of characteristics of children likely to experience success under a given treatment and an analysis of the relationships among the variables studied.

The sample consisted of 44 7, 8, 9, 10, and 11 year old children attending a non-graded university laboratory school. The I.Q. range of the group was normal to high and the children were in the lower half of their respective age groups in reading achievement. The subjects were ranked according to age and reading achievement and randomly assigned to one of three treatment groups. The treatment groups consisted of one perceptual motor training group, one individualized remedial reading group, and a general activity group which served as a placebo control. The subjects attended 35 minute training sessions five days a week for a six month period. A pre and post test design was employed. The evaluation instruments used were the Stanford Achievement Tests, the Purdue Perceptual Motor Survey, and the School Behavior Profile. Test statistics used for the analyses of the data were: a multivariate analysis of covariance, a combined variance and regression technique, as well as the Pearson Product Moment correlational analysis.

The analyses of the data revealed that the perceptual motor training group performed below the level of the other two groups on reading achievement and behavior adjustment. Further, no significant gains in perceptual motor ability were found for any treatment group. The reading group attained the highest post test reading score, and both the reading and control groups were significantly superior to the perceptual motor group in behavior adjustment. The regression analysis revealed that age and initial performance level were dominant factors in the success of any treatment.

Finally, the complex interactions of reading, perceptual motor, and behavioral variables found in the regression analysis suggest that the use of simple correlational techniques is a fruitless approach to the analysis of perceptual motor and reading ability relationships.

The main conclusions of the study were that perceptual motor training did not transfer to performance in reading and that of the two experimental methods examined, long term remedial reading is more effective in developing reading achievement and school behavior adjustment.

I. INTRODUCTION

The purpose of this project was to investigate the effects of perceptual motor training and remedial reading instruction on children's development in perceptual motor skills, reading achievement, and behavior adjustment. The study was undertaken because of recent interest and controversy surrounding the role of perceptual motor training programs in the school curriculum, (Balow, 1968., Klesius, 1970., Krippner, 1966., Mann, 1970., Robbins & Glass, 1969., Silberberg & Silberberg, 1969.) The controversy centers primarily on the question of the generalization of training in perceptual motor skills to performance in reading. Proponents of perceptual motor training programs maintain that the training develops underlying neurological and sensory-motor organization or integration which is essential to the acquisition of reading skills. Various rationales are presented for different systems of this type of training, but the activities suggested by the various systems are similar in that they involve the use of motoric and non-verbal perceptual training as a means of facilitating reading skill in children (Barsch, 1967., Delacato, 1966., Frostig and Horne, 1964., Getman, 1962., Kephart, 1960).

Unfortunately the limited research material on the problem presents conflicting evidence. Studies supporting the positive effects of perceptual motor training consist primarily of case study material of individual children (Delacato, 1966., Kephart, 1960), group studies failing to employ controls (Benyon, 1968., Delacato, 1963., Dillon, Heath, & Biggs, 1970., Lewis, 1968), or more controlled studies presenting serious problems of confounding of variables by combining perceptual motor training with traditional educational methods (Cruickshank, 1961., Gallagher, 1960., Perry, 1966). On the other hand, the bulk of the controlled research literature indicates that perceptual motor training does not provide transfer to performance in reading (Anderson, 1965., Buckland, 1969., Cohen, 1966., Falik, 1969., Foster, 1965., Emmons, 1968., Jacobs, 1968., O'Donnell & Eisenson, 1969., McBeath, 1966., Robbins, 1966).

In spite of the fact that the more soundly designed studies tend to be negative in regard to the question of the generalization of perceptual motor training to performance in reading, the literature is not completely clear cut on the transfer issue. Some research studies give positive results concerning the effectiveness of perceptual motor training on reading and academic skills in general (Chansky & Taylor, 1964., Godfrey, 1963., Halgren, 1961., Ismail & Gruber, 1967., Kershner, 1968., Lazroe, 1968., McCormick, Poetker, Schnobrich & Footlik, 1968 (a).,

McCormick, Schnobrich & Footlik, 1968 (b)., Rutherford, 1966., Silver, Hagin & Hersh, 1967., Simpson, 1968., Tyson, 1963). These studies, however, suffer from the problems of small samples and questionable statistical procedures (Godfrey, 1963., Halgren, 1961., Kershner, 1968., McCormick, Poetker, Schnobrich, & Footlik, 1968 (a)., McCormick, Schnobrich & Footlik, 1968 (b)., Rutherford, 1966., Silver, Hagin & Hersh, 1967., Tyson, 1963) and failure to control for the Hawthorne effect or the simple effect of extra attention given to the experimental groups involved (Chansky & Taylor, 1964., Ismail & Gruber, 1967., Lazroe, 1968., Simpson, 1968). They do, nevertheless, confound the evidence on the transfer question to such an extent that Corrine Kass, a prominent worker in the area of learning disabilities has stated: "No matter how much special educators decry the panaceas which appeal to the parents of children with learning disabilities, it must be admitted that there is not yet enough research information for accepting or rejecting most of these methods." (Kass, 1969, p. 80)

More importantly the research literature revolving around the polemics of the transfer problem does not supply the needs of educators trying to find appropriate differential methods for children with reading problems. For example, there is a tendency to discard the specific positive effects of perceptual motor training on the development of perceptual motor skills, an effect which is no trivial matter for children displaying perceptual motor problems in addition to reading disabilities, and an effect which is fairly well validated in the literature (Cohen, 1966., Cox & Hambly, 1961., Painter, 1966., Rosen, 1966., Stephens, 1970), although there are some negative indications on this point (Alley, 1968., Chasey and Wyrick, 1970., Geddes, 1968., Jacobs, 1968., Robbins, 1966).

In addition while the negative results on the transfer question generally provide a basis for the inference that traditional individualized remedial reading procedures based on the specific problems presented by each child are the most appropiate techniques to be used for children with reading disabilities this assumption has not been tested by a direct comparison of procedures between perceptual motor training and individualized remedial reading instruction.

Further, while the effects of perceptual motor training and cognitive and motor development have received much attention, little systematic investigation has been addressed to the relationship between perceptual motor training and behavior adjustment in children. This area appears to need careful study because of the relationships found between perceptual motor problems and behavior adjustment (Frostig, 1951., Hammond, 1962.,

McBeath, 1966., Hirt, 1970) and the use of perceptual motor training as a means of ego development and basic cognitive organization in programs for disturbed children (Hewett, 1968., Rubin, Simon & Betwee, 1966). Particular problems for investigation include a controlled examination of the actual behavior adjustment gains resulting from perceptual motor training itself, and as compared to another technique such as individualized remedial reading instruction in which the child is provided with an optimum learning situation. Of special interest also is the question of personality patterns and behavior characteristics of children who are likely to experience gains in behavior adjustment as a result of perceptual motor training. This last question is of interest because of the diverse personality patterns and problems in behavior adjustment presented by children with perceptual motor and learning difficulties (Weiner, 1963).

The aim of this study, then, was to provide a controlled comparison of the effects of perceptual motor training and individualized remedial reading instruction on the perceptual motor development, reading achievement, and behavior adjustment of reading disability children in order to provide a basis for sound differential programming for children presenting problems in these areas. More specific goals included an investigation of the various components of the abilities being studied, the identification of characteristics of children likely to experience success under each treatment condition, and relationships among the learning problems presented by the subjects. The focus of the study was the strengths and weaknesses of each method in relationship to the particular problems presented by a specific child.

The project then had four objectives:

1. To determine the differential effectiveness of perceptual motor training and individualized remedial reading instruction on the reading achievement, perceptual motor development, and behavior adjustment of children with reading disabilities.

2. To produce a controlled analysis of the transfer effects of perceptual motor training on reading achievement.

3. To determine the characteristics of children likely to experience gain under the treatment conditions of perceptual motor training and individualized remedial reading instruction.

4. To determine the relationship between perceptual motor problems, reading disabilities, and behavior adjustment.

II. PROCEDURES

Sample

The subjects for the study consisted of 48 7, 8, 9, 10, and 11 year old children attending a non-graded University Laboratory School. The children were selected on the basis of their falling in the lower half of their respective age groups in reading achievement. The mean I.Q. of the group was 116, with a range of 81 to 144. 26 boys and 22 girls were included in the sample. The subjects were ranked according to age and reading achievement and then randomly assigned within levels of age and reading achievement to the experimental and control groups. Four children were withdrawn from the study during the six month experimental period leaving the total number of subjects at 44. To insure that there were were no initial inequalities among the groups, they were compared by means of analyses of variance on age, I.Q., reading achievement, perceptual motor ability, and school behavior adjustment. No significant differences existed among the groups on any of these variables. Initially, however, there was a large, though non-significant difference between one group and the other two groups on behavior adjustment. Randomization was broken, then, to correct this problem and a final analysis of variance run on the variables. Table 1 lists the means, standard deviations, and F ratios on age, I.Q., reading achievement, perceptual motor ability, and school behavior adjustment for the groups at the beginning of the study.

Instruments

Reading achievement was measured by the Stanford Achievement Tests, Reading Sections: Word Meaning, Paragraph Meaning, and Word Study Skills. (Kelly, Madden, Gardener, and Rudman, 1966). The 7 and 8 year old children were administered the Primary II form of the test and the 9, 10, and 11 year olds were given Intermediate I. Form Y was administered in October at the beginning of the study and Form W in April at the conclusion. Perceptual Motor Ability was evaluated by means of the Purdue Perceptual Motor Survey (Roach & Kephart, 1966). For purposes of analysis the twenty-two subtests of the Purdue Perceptual Motor Survey were combined into six ability areas suggested by Roach and Kephart (1966): Laterality, Directionality, Perceptual Motor Match, Balance, Physical Fitness, and Form Perception. Behavior Adjustment was measured by means of the School Behavior Profile, an

Table 1

Analysis of Pretest Scores on Main Variables

	TREATMENTS						
	Perceptual Motor		Reading		Placebo Control		F
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	
Stanford Reading	82.69	31.21	82.07	37.89	84.20	34.29	.0152 NS
Purdue	72.75	7.22	71.40	7.36	73.27	4.76	.3239 NS
School Behavior Profile	34.25	24.38	39.60	20.11	40.20	23.61	.3225 NS
I.Q.	114.00	15.88	120.40	12.67	113.27	12.20	1.2339 NS
Age (Months)	119.94	14.81	113.20	19.55	116.80	14.56	.6561 NS

experimental rating scale on which the classroom teacher rates a child's behavior in five areas: General Characteristics, Language and Thought, Intrapersonal Behavior, Interpersonal Behavior, and Problem Behavior. The School Behavior Profile is contained in Appendix A.

Treatments

The three treatment conditions consisted of two experimental classes: Reading and Perceptual Motor, and one Placebo control. The classes were divided into two instructional groups. Group I for each condition consisted of 9, 10, & 11 year olds and Group II of 7 and 8 year olds. The classes met daily for 35 minute periods during the five day school week from October to April. One teacher and one teacher's aide conducted each instructional group, and the teachers and aides were changed to a different treatment group every two months in order to control for the effect of teacher personality and teaching style on the treatment variables.

Before the experimental classes were begun the teachers in each group designed an individual program for each child based on diagnostic information provided by the pre test data and the children's classroom teachers. Diagnosis and evaluation were continued throughout the project through conferences between the project teachers, classroom teachers, and a learning disabilities specialist attached to the school's faculty. Weekly evaluation sessions were also held with the teacher and aide of each treatment condition and the principal investigator.

The reading treatment condition consisted of a balanced program of word structural analysis, comprehension, and vocabulary development with special stress on each child's particular areas of difficulty. The primary level children displayed major problems in the areas of beginning word attack skills and elementary comprehension skills, and the curriculum for this group emphasized these abilities. In the intermediate group of 9, 10, and 11 year old children remedial work in grade 1 to 3 word analysis skills, advanced inference, judgement, and thinking skills were emphasized.

Activities and materials for the reading group included the SRA Reading Laboratory, teacher made and commercial reading games such as Quizmo, Concentration, Probe, crossword puzzles, library books, poems, plays, and limericks. Skill worksheets and teacher and student made stories were also used.

The Perceptual Motor Treatment consisted of a balanced pro-

gram of perceptual motor skills with special emphasis placed on the deficit areas for individual children. For the instructional group containing the primary level children the abilities of laterality, directionality, and form perception were stressed, while balance and perceptual motor match were emphasized for the older group. The specific areas of emphasis for each group were determined by the predominate needs of the children in each class.

Major materials and activities for this condition included walking board, balance beam, trampoline and chalkboard activities, stunts, geometric design work with parquetry blocks, cubes, and peg boards, together with the Frostig-Horne Visual Perception Program materials, tachistoscopic and auditory training activities. All visual and auditory training stimuli used in this condition were non-verbal.

The Placebo control groups' curriculum consisted of a series of activity units such as "Holidays," "Crafts," and "Good Sportmanship." Reading and perceptual motor activities were minimized in this group, and when it was necessary to involve these abilities the time spent in each of these skill areas was balanced. For example, for every lesson involving art work where perceptual motor was most pronounced a reading related activity was used. The reading and perceptual motor activities that were included in this condition were of a relatively incidental nature and quite different from the carefully programmed activities in these areas in the other two experimental groups. Films were also used extensively in these classes and an emphasis was placed on creative motivating activities for this group.

III. RESULTS

The analysis of the data was divided in three sections. First a multivariate analysis of covariance was conducted to determine both treatment and age effects. Second, a descriptive analysis involving regression procedures combined with a binary splitting technique of variables based on the residual sums of squares (Stover, 1971) was conducted in order to determine the characteristics of children who experienced success under each treatment. Third, correlation coefficients were computed to determine the relationship among all the variables in the population of this study.

Multivariate Analysis of Covariance

Two 2-way multivariate analyses of covariance were con-

ducted on the post test scores using I.Q. and the pretest scores as covariates. The factors were treatments and age. The two-way model involving the age factor was used because of the importance of age as a variable in the success of perceptual motor training programs (O'Donnell & Eisenson, 1969., Roach, 1966). There were three treatment conditions and two levels of age, 90 to 119 months and 120 to 142 months. The first analysis was conducted on the 14 subtest variables. These included 3 for reading: Word Meaning, Paragraph Meaning, and Word Study Skills: 6 for perceptual motor ability: Laterality, Directionality, Perceptual Motor Match, Balance, Physical Fitness, and Form Perception; and 5 for behavior adjustment: General Characteristics, Language and Thought, Intrapersonal Behavior, Problem Behavior, and Interpersonal Behavior. The second analysis was conducted on the Reading, Perceptual Motor, and Behavior Adjustment total scores.

The analysis across treatment conditions revealed significant differences among the treatments on the behavior adjustment variables. Probability levels below the .05 level were attained for Language and Thought and Interpersonal Behavior. Borderline significance was reached for Total Behavior Adjustment, General Characteristics, and Intrapersonal Behavior. Table 2 presents the post test means and p values for the F ratios for the treatment conditions on these variables. Scheffe' contrasts revealed that the perceptual motor treatment was associated with poorer performance in each behavior adjustment area except Intrapersonal Behavior. The higher mean scores of this group listed in table 2 indicate a higher rate of problem behaviors in this area. The confidence intervals in the Scheffe' Contrasts involving the perceptual motor group in comparison with the reading and control groups had p values of .01 for Language and Thought and General Characteristics, and .05 for Total Behavior Adjustment and Interpersonal Behavior. There were no significant differences between the reading and control groups on these variables. The mean of these two groups shown in table 2, however, suggest that superior performance in Total Behavior Adjustment, General Characteristics, and Language and Thought was associated with the reading condition. The control group demonstrated the lowest behavior adjustment problem scores in the areas of Interpersonal Behavior as well as Intrapersonal Behavior.

No significant differences were found among the treatments for the perceptual motor or reading variables. The pre and post test Perceptual Motor Total mean scores shown in table 3 indicate little change in any group's performance as a function of treatment condition. The three treatment conditions did show mean differences in Total Reading scores. The reading treatment had the highest post test mean, followed by the control group. The perceptual motor training group had the lowest mean post test

Table 2

Treatment Differences Significant at the
.10 Level and Below

Variable	Group Post Test Means			p <
	Perceptual Motor	Reading	Control	
Language & Thought	8.75	7.14	8.14	.02
Interpersonal Behavior	10.63	9.64	9.43	.03
General Characteristics	10.31	8.14	9.64	.10
Intrapersonal Behavior	6.13	6.64	5.93	.08
Behavior Total	41.63	36.64	38.36	.09

Table 3

Pre and Post Test Means and Standard Deviations for Perceptual Motor Total Score

Test	Treatment Group					
	Perceptual Motor		Reading		Control	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Pre	72.13	7.17	72.14	7.05	73.21	4.93
Post	71.69	4.30	72.36	5.86	71.50	5.01

Table 4

Pre and Post Test Means and Standard Deviations for Reading Total Score

Test	Treatment Group					
	Perceptual Motor		Reading		Control	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Pre	83.69	20.14	85.79	36.62	87.50	30.62
Post	93.25	21.13	101.21	26.37	96.29	20.95

total reading score. The pre and post test Total Reading score means for each condition are listed in table 4, and appendix C contains the pre and post test means and standard deviations for all variables.

The treatment conditions, then, produced their main effects on the behavior adjustment variables. The analysis of age differences revealed that this variable also had a strong effect on behavior adjustment. As indicated in table 5, significant differences between the age groups were found on Total Behavior adjustment, and the subtest areas of General Characteristics, Language and Thought, Problem Behavior, Interpersonal and Intrapersonal Behavior. The differences between age groups on this last subtest reached only borderline significance. Age differences were also significant for the reading comprehension variable of Paragraph Meaning., and borderline significance was attained for the Perceptual Motor Match subtest. In each case the older children (120-142 months) were superior to the younger children (90-119 months). The variable of age, then, showed a strong effect on the behavior adjustment variables and reading comprehension, and demonstrated some slight effect on Perceptual Motor Matching ability.

In the age x treatment analysis significant differences were found in only two instances and these occurred at a borderline level. First, as indicated in table 6, an age x treatment interaction significant at the .09 level was attained for the reading comprehension variable of Paragraph Meaning. The older children were superior in all treatments, but as table 6 and figure 1 indicate the greatest differences existed between the older and younger children in the reading group. The older children in this group demonstrated the greatest superiority in reading comprehension; Scheffe' Contrasts revealed that these differences were significantly higher than those of the other two groups at the .05 level. No significant differences existed between the percpetual motor and control groups in Paragraph Meaning. The older children who were given specific training in reading, then, performed best on reading comprehension.

A second age x treatment interaction approached significance at the .06 level on the perceptual motor variable of Physical Fitness. As shown in table 6 and figure 2, the older children in all treatments performed equally well. There was no difference between the older and younger children in the placebo control group, younger children in the perceptual motor training group were superior to those in the reading group, but did not surpass the performance of

Table 5

Age Differences Significant at
the .10 Level and Below

Variable	Group Post Test Means		p <
	Older Children (122-140 mos.)	Younger Children (90-121 mos.)	
Paragraph Meaning	37.91	30.64	.001
General Characteristics	5.00	13.82	.03
Language & Thought	5.59	10.50	.01
Problem Behavior	3.59	7.18	.02
Interpersonal Behavior	6.32	13.55	.0001
Behavior Total	24.23	53.77	.0001
Intrapersonal Behavior	3.73	8.73	.06
Perceptual Motor Match	27.91	27.31	.08

Table 6

Treatment x Age Interactions Significant at the .10 Level and Below

Variable	Group Post Test Means			p
	Age	Treatment Group		
		Perceptual Motor	Reading	Control	
Paragraph Meaning	Older 122-140 mos.	34.78	44.00	36.71	.09
	Younger 90-121 mos.	32.86	26.88	32.71	
Physical Fitness	Older 122-140 mos.	4.00	4.00	4.00	.06
	Younger 90-121 mos.	3.85	3.75	4.00	

Figure 1

Age x Treatment Interaction
for Reading Sub-test,
Paragraph Meaning

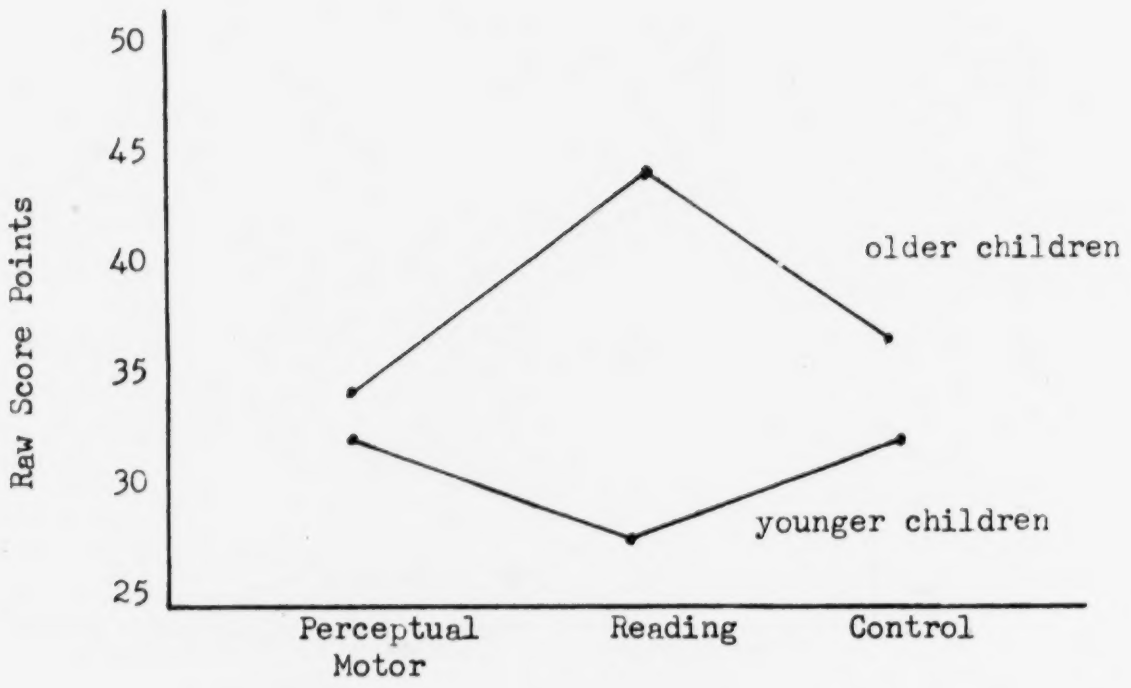
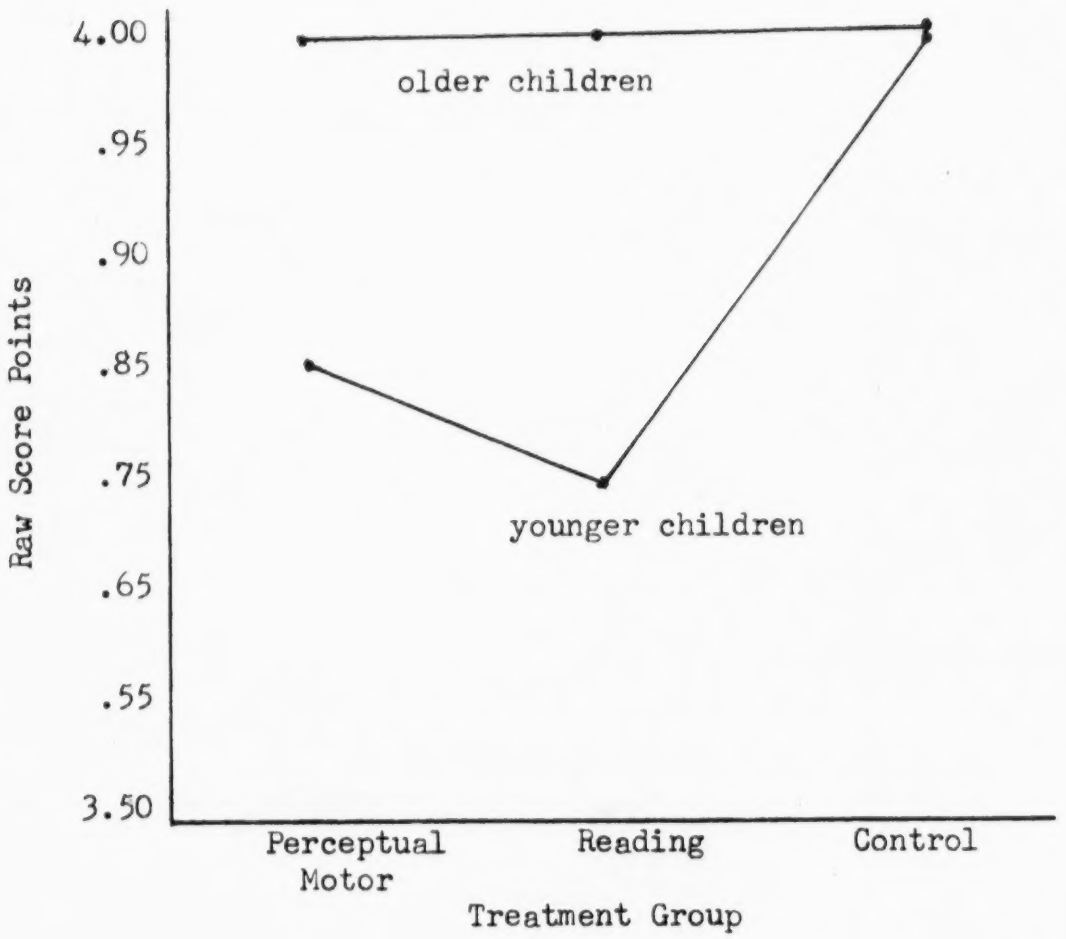


Figure 2

Age x Treatment Interaction for
Perceptual Motor Sub-Test,
Physical Fitness



the younger children in the control group. Scheffe' Contrasts revealed that the age differences within each treatment group were different from the others at the .10 level. Some caution should be observed in regard to the treatment x age interaction results because the differences among the groups were very small, due largely to the fact that most of the subjects attained ceiling on the 4 point rating scale for this variable. However, the Physical Fitness subtest is the most objective and easily scored item on the Purdue Perceptual Motor Survey, and is one of the most sensitive to small differences in ability levels.

The total multivariate analyses revealed, then, that treatment conditions produced significant differences in the school behavior adjustment of the subjects. The perceptual motor treatment was associated with poorest performance in this area, and placement in either the reading or control groups was associated with superior performance. No differences were found among the treatment conditions for perceptual motor ability. Mean differences existed between the groups on Total Reading scores with the highest mean occurring in the reading treatment group, the next highest in the control group, and the lowest in the perceptual motor group. These differences, however, did not approach significance. Age differences were found to have a strong effect on the behavior adjustment variables as well as reading comprehension. Age differences were also a factor in Perceptual Motor Matching ability. In each case the higher age levels demonstrated better performance. The treatment x age interactions indicated that first, older children who receive specific reading instruction perform better in reading comprehension than any other age and treatment combination. Secondly, the age x treatment interaction of the Physical Fitness variable suggested that older children under any treatment condition do equally well in this area. For younger children, however, the placebo control conditions were associated with the best performance followed by the conditions of the perceptual motor group and the reading group.

Automatic Interaction Detector Analysis

The Automatic Interaction Detector Analysis used in this section of the analysis is a computer program designed to explain the interrelationships among large sets of variables. One of the variables is treated as the dependent variable. The program uses a nonsymmetric branching technique based on variance analysis methods. By means of a series of binary

splits, sets of mutually exclusive subgroups of independent variables are derived with the purpose of explaining the variance of the dependent variable. Out of the total number of groups a set of final subgroups are chosen so that their means account for more of the total sum of squares than the means of any other equal number of the subgroups. The program provides a description of which variables are related to the dependent variable under what conditions and in which combinations. Its use in this project was first, to identify precisely as possible the characteristics of children who experienced success under any particular treatment condition. Second, the program was used to determine the nature of the complex etiological factors involved in problems displayed by children on the abilities represented by the main outcome measures.

For this study twelve runs of the AID II program were made. Three analyses each were completed for each of the three treatment groups. For each group one analysis was conducted using the Reading Total post test scores as the criterion variable, one using the Perceptual Motor Total post test scores and one using the Behavior Total post test scores as the dependent variable. Three more analyses were conducted on the total sample of 44 children using the reading, perceptual motor and behavior total post test scores as dependent variables. Twenty predictor variables were used, age, IQ, sex and the 17 pre test reading, perceptual motor and behavioral variables described above. For the last three analyses the additional predictor variable of experimental group was added, making a total of 21 variables.

Perceptual Motor Group

For the perceptual motor training group six final subgroups accounted for 95.80 % of the variance of the post test Reading Total scores (see table 7 and figure 3). Pre test characteristics associated with outcome scores above the total group mean of 96.75 were Word Meaning, IQ, and Balance. High Word Meaning and high IQ scores were associated with high reading total scores and Balance was inversely related to reading success. Less successful outcome scores were associated with various combinations of low performance in reading skills and lower IQ scores.

For this same training group five final subgroups accounted for 85.03 % of the variance of post test total perceptual motor performance (see table 8 and figure 4). Initial level of Total Perceptual Motor ability distinguished the least successful and most successful performance in the area of perceptual motor ability itself. Most successful children in the perceptual motor area were characterized by proficiency in both Perceptual Motor Total ability and Word Meaning. Less successful children displayed poorer performance in Word Meaning. IQ was inversely related to post test perceptual motor performance, but high Problem Behavior ratings were associated with poorer perceptual motor performance than were low ratings.

Table 7

AID Analysis, Perceptual Motor Training Group, $\bar{Y}$ = Reading Total

Group	Type	N	Mean Post Test Reading Total Score	SD
8	Word Meaning - High, IQ - High, Balance - Low	2	129.00	6.00
9	Word Meaning - High, IQ - High, Balance - High	4	109.50	3.36
7	Word Meaning - Low, Word Study Skills - High	2	93.00	6.00
4	Word Meaning - High, IQ - Low	1	84.00	.00
10	Word Meaning - Very Low, Word Study Skills - Low	2	79.50	1.50
11	Word Meaning - Low Average, Word Study Skills - Low	5	70.20	4.50

Figure 3

Subgroups of Binary Splits - Perceptual Motor Group - $\bar{Y}$ = Reading Total Score

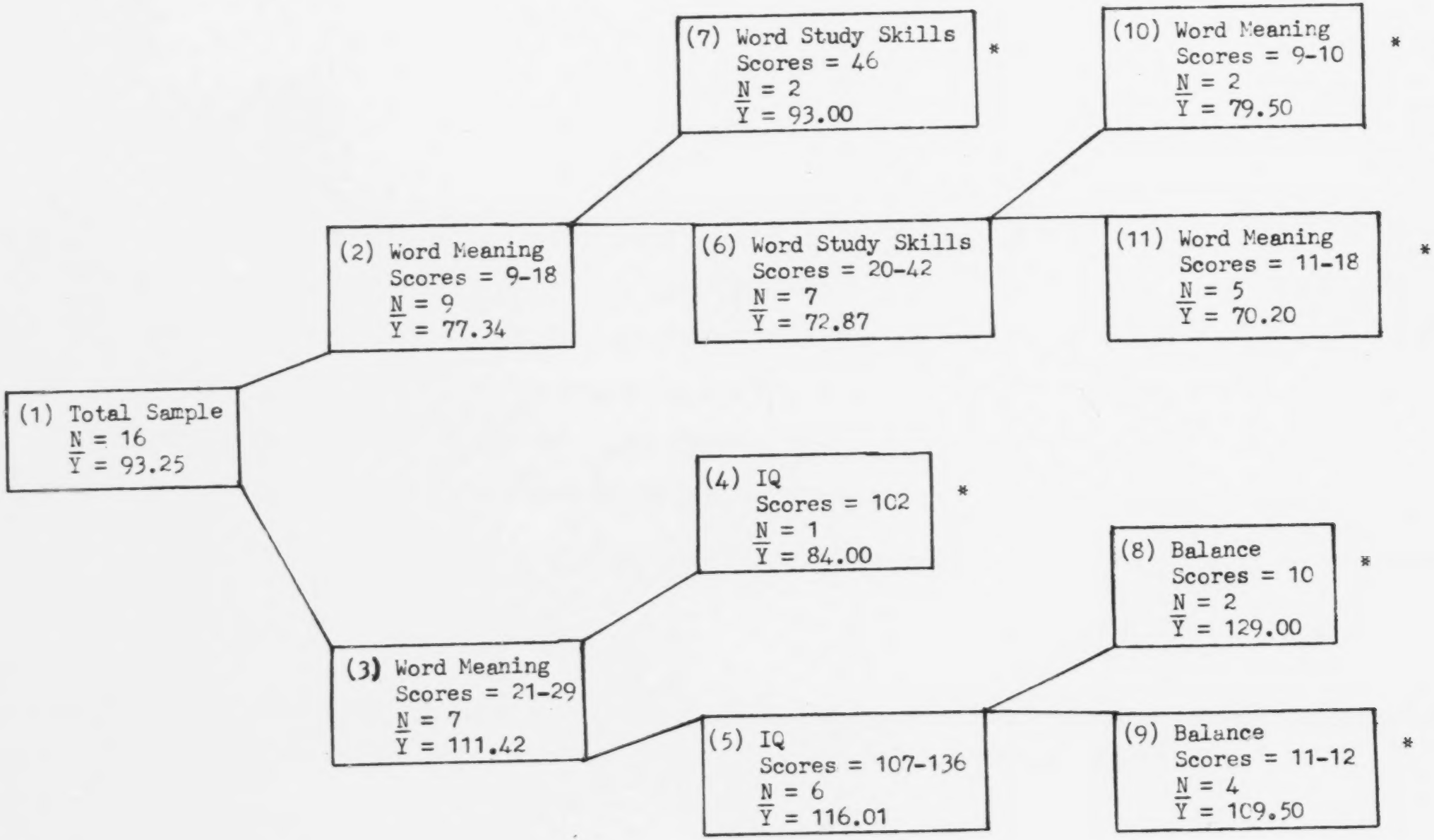


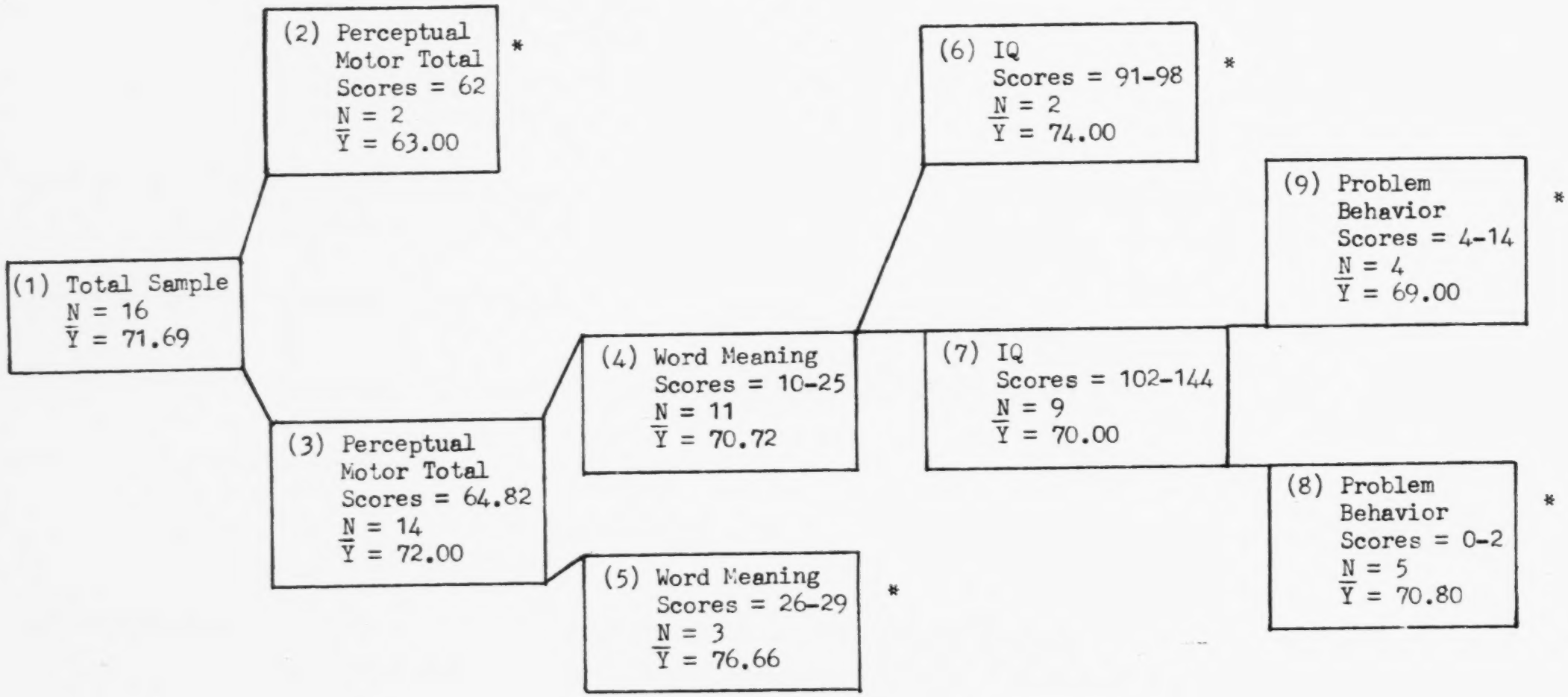
Table 8

AID Analysis, Perceptual Motor Training Group, $\bar{Y}$ = Perceptual Motor Total

Group	Type	N	Mean Post Test Perceptual Motor Total Score	SD
5	Perceptual Motor Total - High, Word Meaning - High	3	76.66	3.38
6	Perceptual Motor Total - High, Word Meaning - Low, IQ - Low	2	74.00	.00
8	Perceptual Motor Total - High, Word Meaning - Low, IQ - High, Problem Behavior - Low	5	70.80	.98
9	Perceptual Motor Total - High, Word Meaning - Low, IQ - High, Problem Behavior - High	4	69.00	1.00
2	Perceptual Motor Total - Low	2	63.00	1.00

Figure 4

Subgroups of Binary Splits - Perceptual Motor Group - $\overline{Y}$ = Perceptual Motor Total Group



The subgroup involving the lowest criterion score of 63 is of special interest because the score value is the only one below the score of 65, the cut off point identified by Roach and Kephart (1966) as an indicator of learning problems serious enough for perceptual motor therapy. The only predictor for this score level was low initial perceptual motor performance itself.

On school Behavior Total post test performance for the perceptual motor training condition four subgroups accounted for 93.39 % of the variance (see table 9 and figure 5). Age discriminated the two upper and lower subgroups. The older children (120-142 mos.) had total behavior problem ratings below the group mean of 39.00, while the younger children (95-117 mos.) had behavior problem ratings above the mean. Intrapersonal behavior was also a factor in the upper two predictive groups. Older children who were viewed by their teachers as having few problems in relating to other people performed best in the total behavior area. Older children demonstrating more problems in Intrapersonal behavior were less successful, but still maintained performance below the mean of the group. For the lower age groups Word Meaning was an important predictive factor, but for the younger children this variable was inversely related to post test school behavior performance.

Reading Group

Four subgroups accounted for 93.39 % of the variance of Reading Total post test performance for the reading training condition (see table 10 and figure 6). Word Study Skills was the main variable distinguishing the successful from non-successful groups. Children with higher initial Word Study Skills comprised the upper two groups with post test reading scores above the mean of 96.75 for the total three experimental groups. Lower initial Word Study Skills on the other hand, was predictive of post test performance below the mean. For the upper two groups Word Meaning was also an important factor. Higher initial scores on this subtest were associated with better post test reading performance than were low scores. In the lower subgroups Laterality was an important predictor variable. High Laterality scores were associated with higher post test reading level than low Laterality scores. High Laterality, however, was associated with post test reading performance 10 points below the group mean of 96.75. These results are the reverse of those for the perceptual motor training groups, where the perceptual motor variable of balance was inversely related to successful reading performance.

Perceptual-motor performance for the reading group was predicted by four final subgroups also, (see table 11 and figure 7). Paragraph Meaning and Perceptual Motor Match accounted for 83.88 % of the variance of post test percep-

Table 9

AID Analysis, Perceptual Motor Training Group, $\bar{Y}$ = Behavior Total

Group	Type	N	Mean Post Test Behavior Total Score	SD
6	Age - High, Intrapersonal Behavior - Low	4	6.00	4.48
7	Age - High, Intrapersonal Behavior - High	5	31.20	6.40
4	Age - Low, Word Meaning - Low	4	48.00	11.68
5	Age - Low, Word Meaning - High	3	89.32	5.00

Figure 5

Subgroups of Binary Splits - Perceptual Motor Group - $\overline{Y}$ = Behavior Total Score

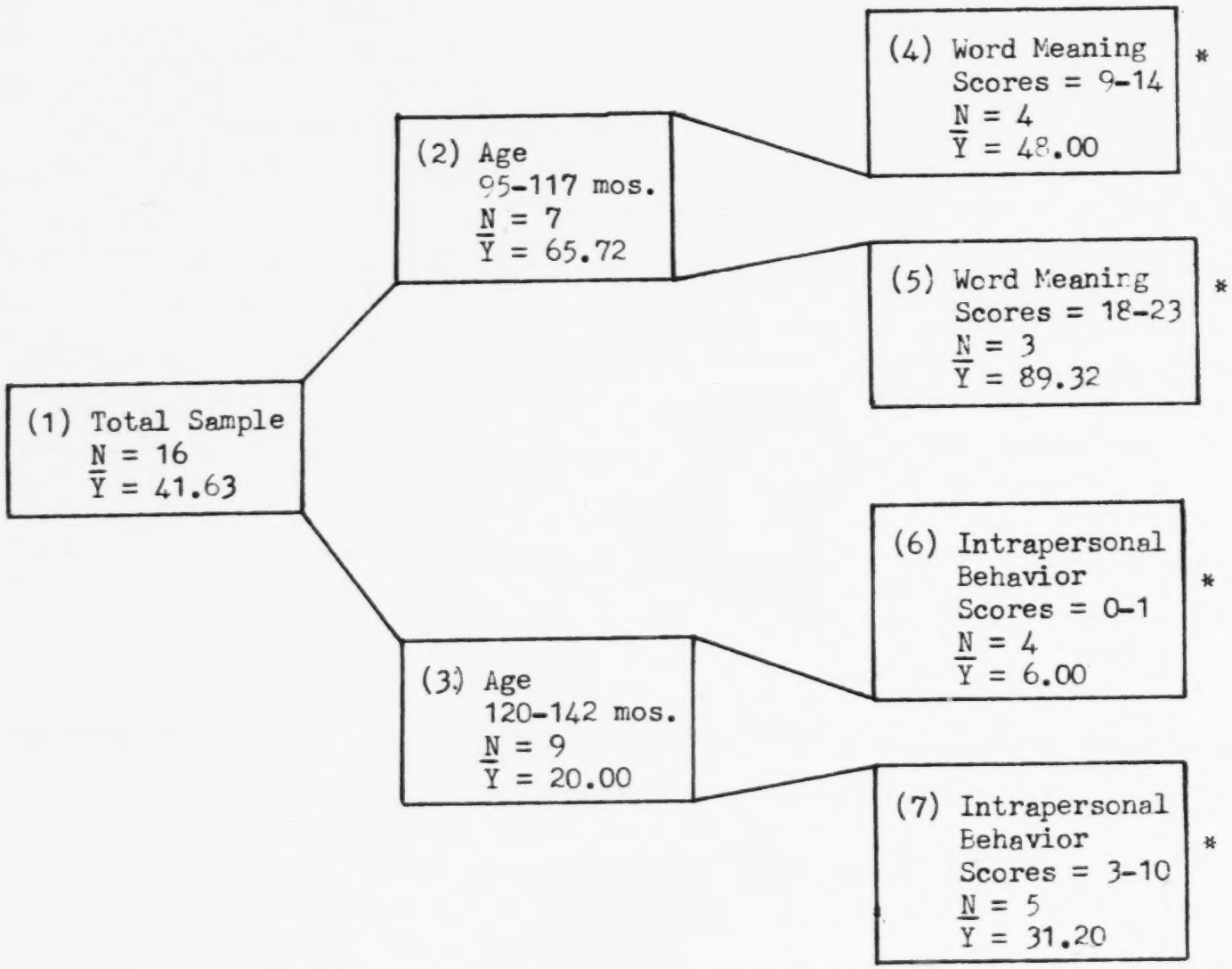


Table 10

AID Analysis, Reading Training Group, $\bar{Y}$ = Reading Total

Group	Type	N	Mean Post Test Behavior Total Score	SD
7	Word Study Skills - High, Word Meaning - High	3	134.01	5.10
6	Word Study Skills - High, Word Meaning - Low	4	115.50	8.07
5	Word Study Skills - Low, Laterality - High	4	84.75	5.37
4	Word Study Skills - Low, Laterality - Low	3	65.01	7.86

Figure 6

Subgroups of Binary Splits - Reading Group - $\bar{Y}$ = Reading Total Score

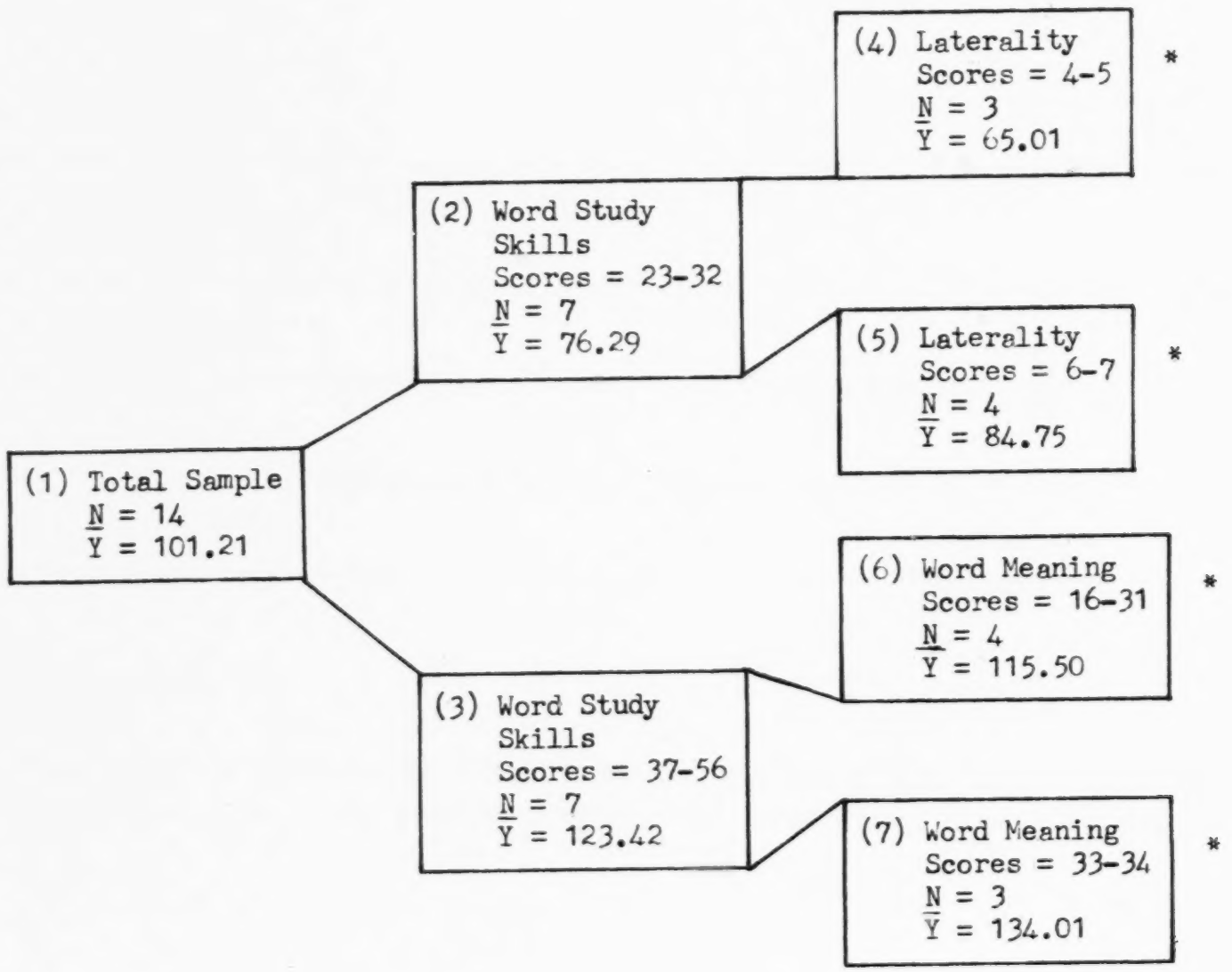


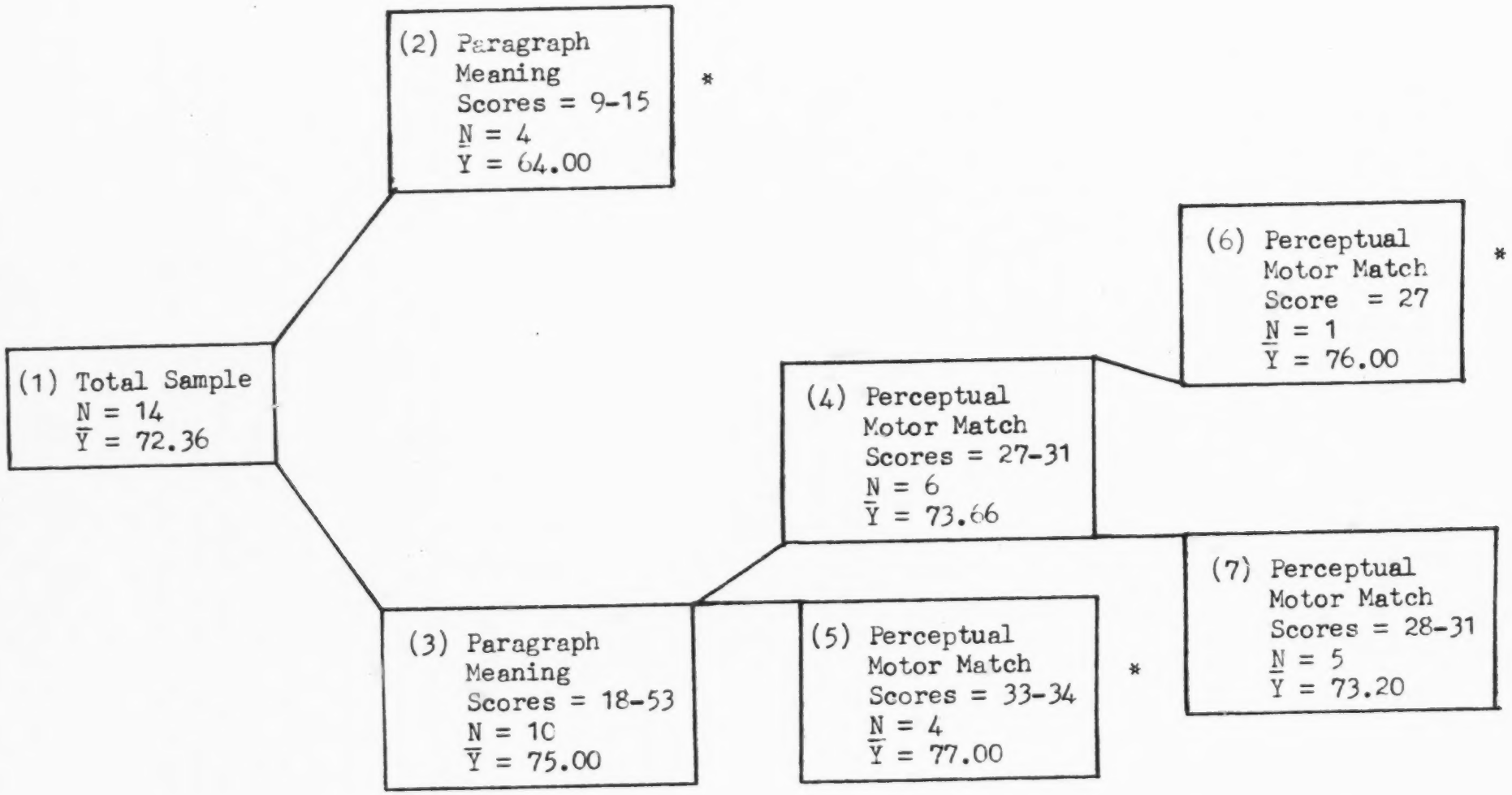
Table 11

AID Analysis, Reading Training Group, $\bar{Y}$ = Perceptual Motor Total

Group	Type	$\bar{X}$	Mean Post Test Perceptual Motor Total Score	SD
5	Paragraph Meaning - High, Perceptual Motor Match - High	4	77.00	1.74
6	Paragraph Meaning - High, Perceptual Motor Match - Low	1	76.00	.00
7	Paragraph Meaning - High, Perceptual Motor Match - Average	5	73.20	1.00
2	Paragraph Meaning - Low	4	64.00	3.74

Figure 7

Subgroups of Binary Splits - Reading Group - $\bar{Y}$ = Perceptual Motor Total Score



tual motor performance. The analysis for this group revealed the interesting finding that the reading comprehension variable of Paragraph Meaning was a major predictor for post test Total Perceptual Motor performance. High scores on Paragraph Meaning were associated with post test perceptual motor performance above the total group mean of 71.84. On the other hand lower performance on Paragraph Meaning was the sole predictor of Perceptual Motor performance below the mean. The criterion variable of this low group was a score of 64, a score that coincides with Roach's and Kephart's region of learning problem performance. For the remaining upper levels the variable of Perceptual Motor Match combined with Paragraph Meaning as a major predictor.

School Behavior Total performance for the reading group was associated with four subgroups (see table 12 and figure 8). General Characteristics, Laterality, and Age accounted for 94.43 % of the variance of Behavior post test performance. The behavioral variable of General Characteristics was the main discriminant between the successful and non-successful performance. Children having low initial problem ratings on this variable had post test scores below the mean of 39.00 on post test school problem behavior. Children with high pre test ratings on General Characteristics scored above the mean. For the top three successful groups, Laterality and Age also had important predictive functions.

Laterality was inversely related to good post test school behavior performance. Children exhibiting lower initial scores on Laterality had few post test problem behavior ratings while the children with high Laterality scores displayed higher behavior problem ratings. Age followed the trend found in the perceptual motor training group. Older children (114-142 mos.) had lower post test behavior problem ratings than the younger children (90-91 mos.).

Control Group

Four subgroups accounted for 91.53 % of the variance in the post test reading performance of the control group (see table 13 and figure 9). Paragraph Meaning was the main variable which distinguished the successful and unsuccessful groups in reading. High initial scorers on Paragraph Meaning comprised the top two groups having post test scores above the total sample mean of 96.75. Children with lower scores on this variable comprised the bottom groups in post test reading performance. For the successful children Word Study Skills was also an important variable. Children with

Table 12

AID Analysis, Reading Training Group, $\bar{Y}$ = Behavior Total

Group	Type	N	Mean Post Test Behavior Total Score	SD
4	General Characteristics - Low, Laterality - Low	2	18.00	2.00
7	General Characteristics - Low, Laterality - High, Age - High	7	29.16	2.80
6	General Characteristics - Low, Laterality - High, Age - Low	2	36.00	.00
3	General Characteristics - High	3	60.00	5.64

Figure 8

Subgroups of Binary Splits - Reading Group - $\overline{Y}$ = Behavior Total Score

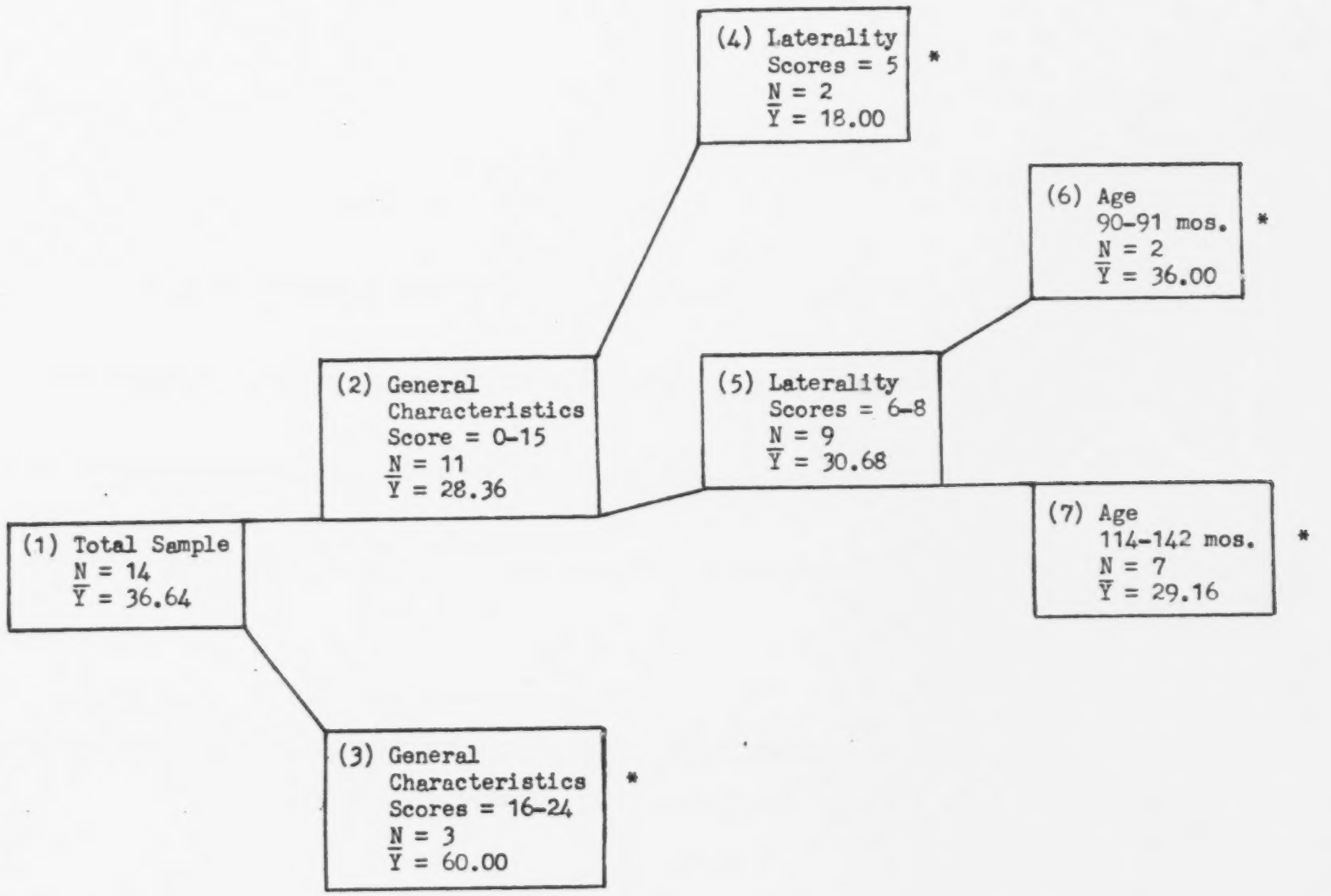


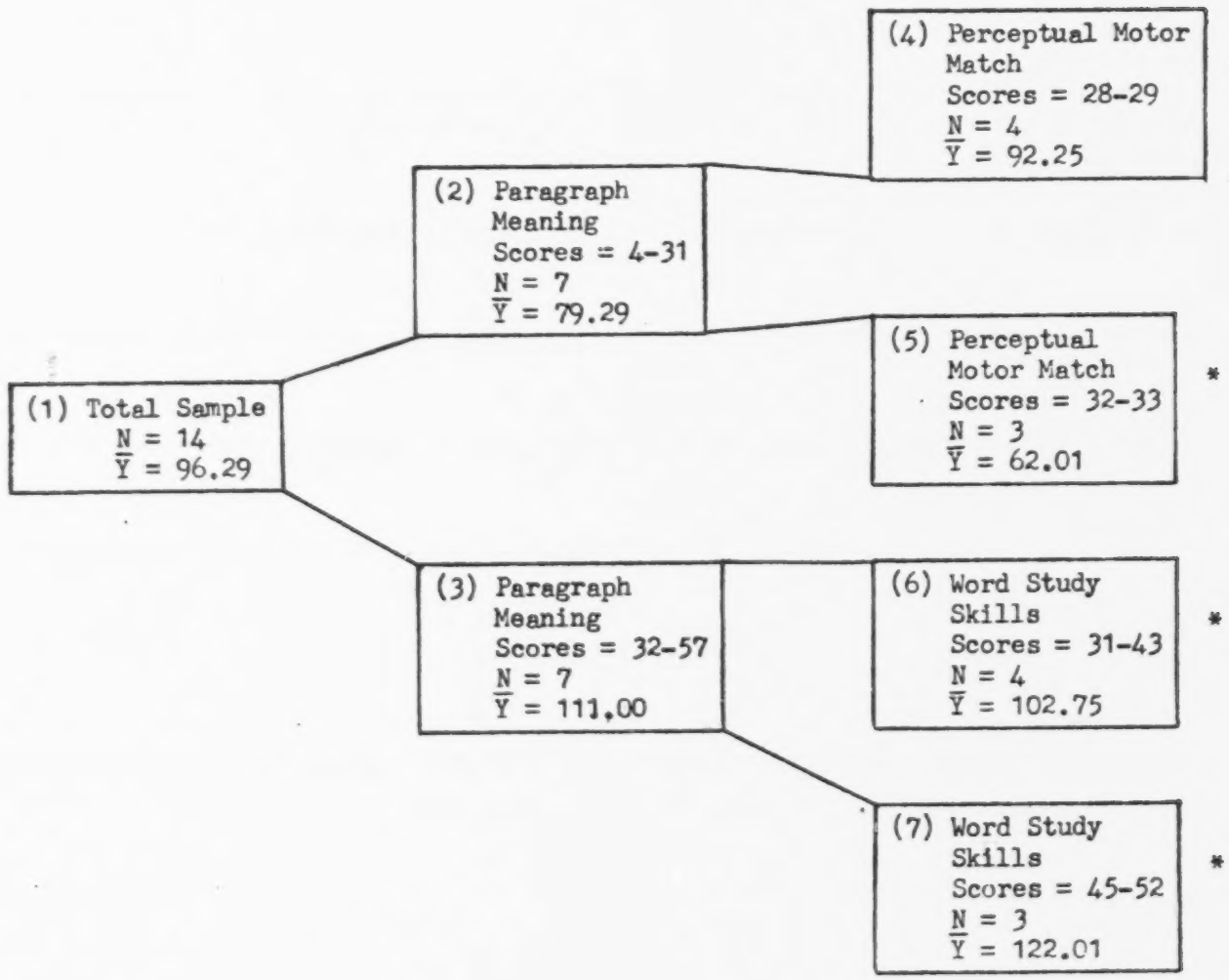
Table 13

AID Analysis, Control Group, $\bar{Y}$ = Reading Total

Group	Type	N	Mean Post Test Reading Total Score	SD
7	Paragraph Meaning - High, Word Study Skills - High	3	122.01	.57
6	Paragraph Meaning - High, Word Study Skills - Low	4	102.75	2.49
4	Paragraph Meaning - Low, Perceptual Motor Match - Low	4	92.25	6.84
5	Paragraph Meaning - Low, Perceptual Motor Match - High	3	62.01	8.61

Figure 9

Subgroups of Binary Splits - Control Group
$\overline{Y}$ = Reading Total Score



high inital Word Study Skills performed best in reading, while the lower scorers achieved only at the second level of reading achievement. Perceptual Motor Match was an important predictor in the lower groups, and this variable had an inverse relationship to post test reading success. High scores on Perceptual Motor Match were associated with the lowest post test reading mean.

The post test Perceptual Motor Total performance for this group was predicted by five final subgroups (see table 14 and figure 10). The variables of Age, Word Meaning, Problem Behavior, and Laterality accounted for 95.38 % of the post test Perceptual Motor Total performance. Age was the main discriminant for the top and bottom groups. Older children (137-142 mos.) attained the highest perceptual motor score and the younger children (90-129 mos.) formed all the groups below that level. Subjects who were initially more successful on the reading, behavioral, and perceptual motor variables were also more successful on Perceptual Motor Total performance. A particular point of interest is that Word Meaning emerged as an important predictor of perceptual motor performance. Just as in the reading and perceptual motor training groups a reading variable emerged as predictor of perceptual motor performance.

Four final subgroups accounted for 97.53 % of the variance in Total School Behavior performance for the control group (see table 15 and figure 11). Language and Thought was the most important factor in this analysis. Children who recieved low or average initial ratings for problems in Language and Thought had lower problem post test ratings for Total Behavior than children with high problem ratings on this variable. IQ was a predictive factor for the two bottom groups, and was inversely related to total Behavior problem ratings when it was combined with high problem ratings in Language and Thought.

Total Sample

Nine final subgroups accounted for 89.31 % of the variance in Reading Total performance for the total sample (see table 16 and figure 12). Word meaning was a major discriminant between the successful and non-successful scores on post test Reading Total performance. Children with high and average initial Word Meaning scores formed the groups having post test reading scores above the group mean of 96.75, while those with lower Word Meaning scores formed the groups below the mean. Word Study Skills, Language and Thought, General Characteris-

Table 14

AID Analysis, Control Group, $\bar{Y}$ = Perceptual Motor Total

Group	Type	N	Mean Post Test Perceptual Motor Total Score	SD
3	Age - High	3	78.00	.00
6	Age - Low, Word Meaning - High, Problem Behavior - Low	4	72.50	1.66
9	Age - Low, Word Meaning - High, Problem Behavior - High, Laterality - High	5	68.80	.98
8	Age - Low, Word Meaning - High, Problem Behavior - High, Laterality - Low	1	66.00	.00
4	Age - Low, Word Meaning - Low	1	60.00	1.00

Figure 10

Subgroups of Binary Splits - Control Group
$\bar{Y}$ = Perceptual Motor Total Score

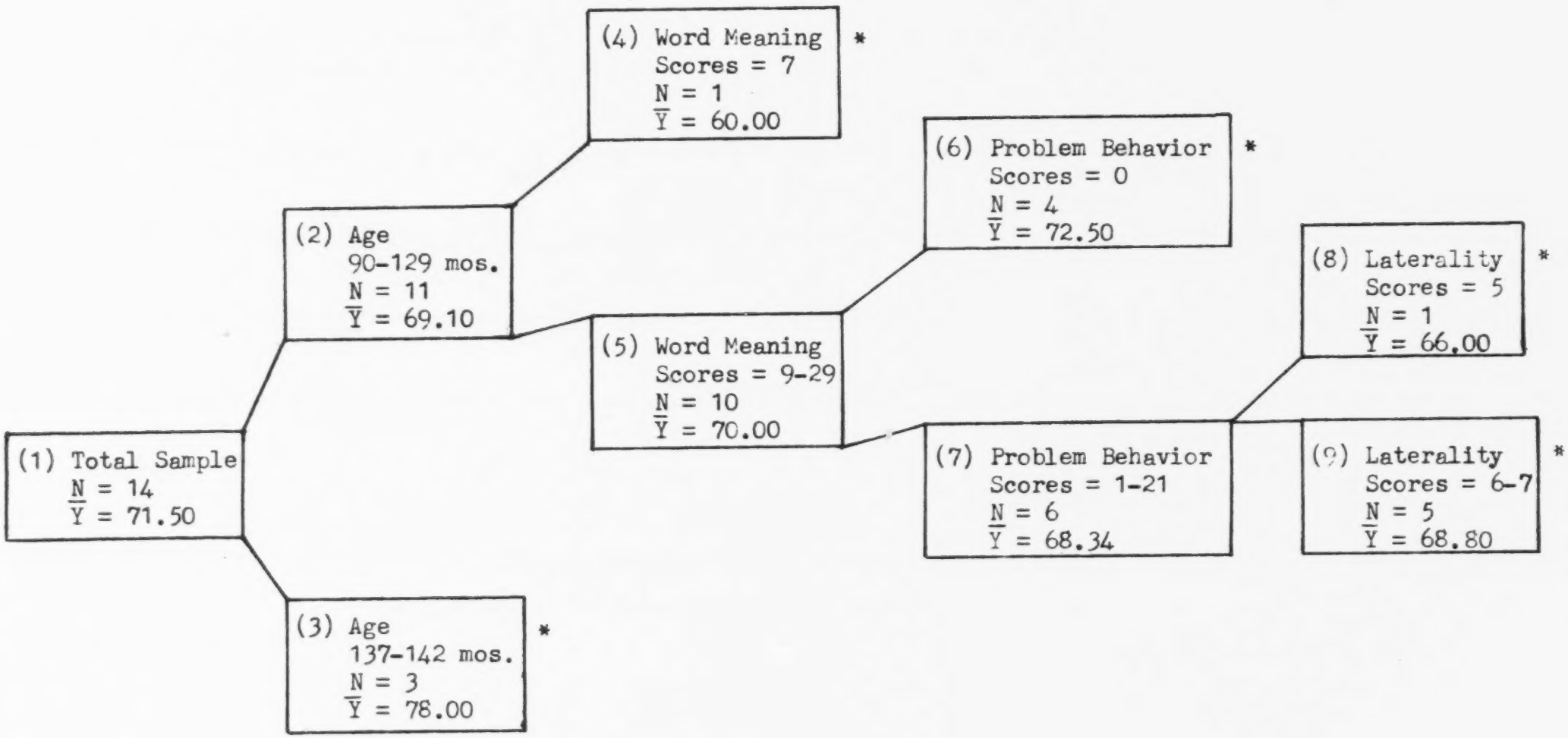


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Table 15

AID Analysis, Control Group, $\bar{Y}$ = Behavior Total

Group	Type	N	Mean Post Test Behavior Total Score	SD
6	Language & Thought - Very Low	5	12.80	4.68
7	Language & Thought - Low Average	4	26.00	3.48
4	Language & Thought - High, IQ - Low	3	54.68	5.00
5	Language & Thought - High, IQ - High	2	92.00	4.00

Figure 11

Subgroups of Binary Splits - Control Group
$\bar{Y}$ = Behavior Total Score

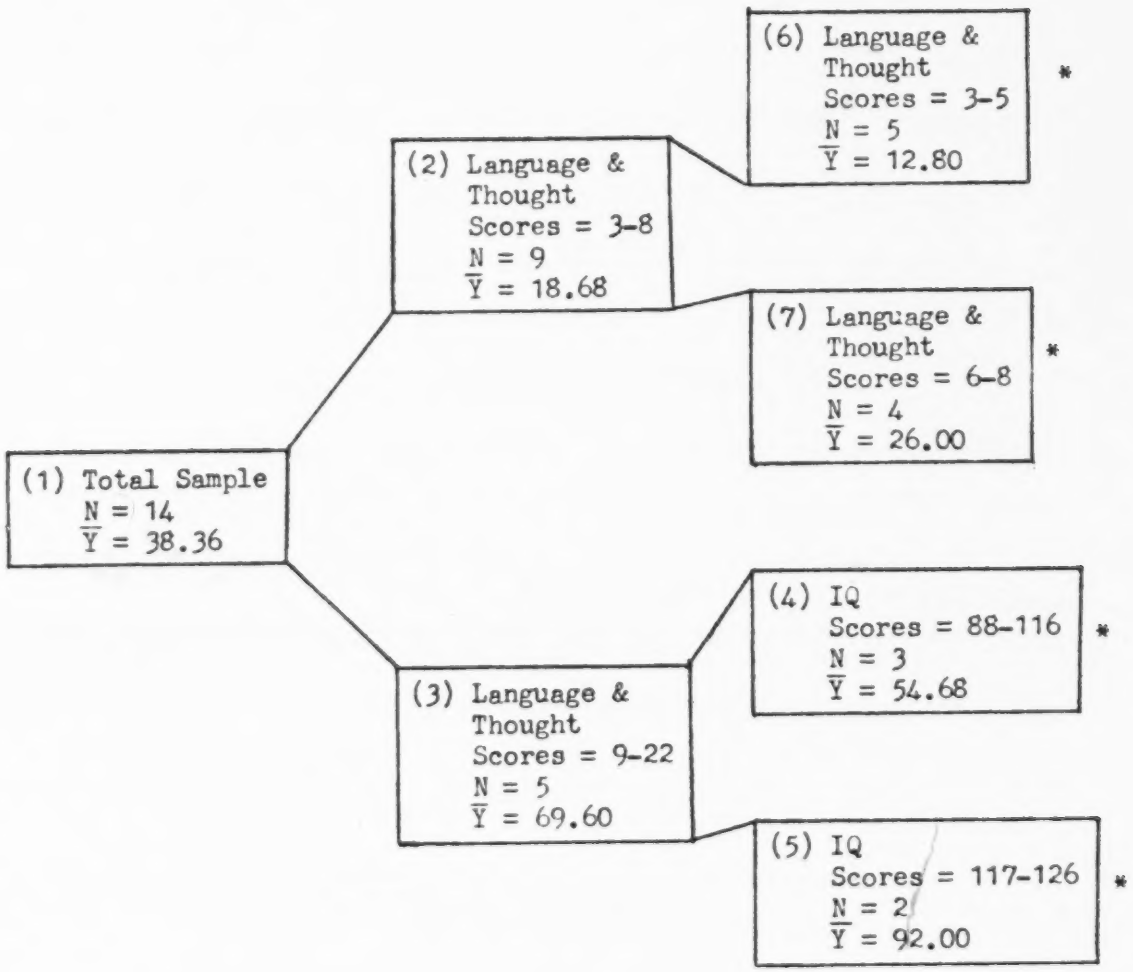


Table 16

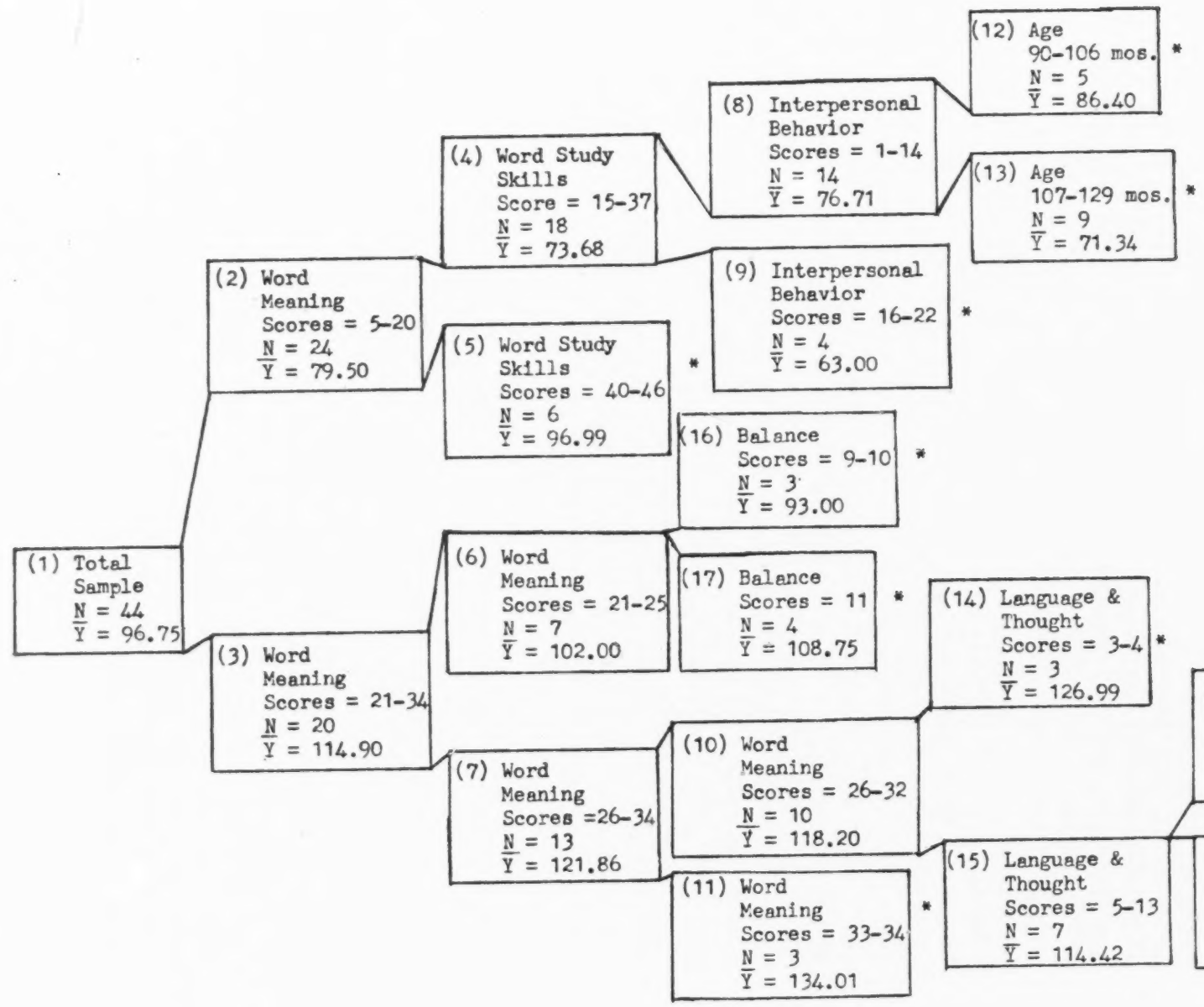
AID Analysis, Total Sample, $\bar{Y}$ = Reading Total

Group	Type	N	Mean Post Test Reading Total Score	SD
11	Word Meaning - High 4*	3	134.01	5.10
14	Word Meaning - High 3*, Language & Thought - Low	3	126.99	6.15
19	Word Meaning - High 3*, Language & Thought - High, General Characteristics - High	5	118.80	6.72
17	Word Meaning - High 1*, Balance - High	4	108.75	3.90
18	Word Meaning - High 3*, Language & Thought - High, General Characteristics - Low	2	103.50	1.50
5	Word Meaning - Low, Word Study Skills - High	6	96.99	11.31
16	Word Meaning - High 1*, Balance - Low	3	93.00	7.35
12	Word Meaning - Low, Word Study Skills - Low, Interpersonal Behavior - Low, Age - Low	5	86.40	7.20
13	Word Meaning - Low, Word Study Skills - Low, Interpersonal Behavior - Low, Age - High	9	71.31	5.25
9	Word Meaning - Low, Word Study Skills - Low, Interpersonal Behavior - High	4	63.00	11.82

* The High Word Meaning groups are coded by number from lowest to highest

Figure 12

Subgroups of Binary Splits - Total Group - $\overline{Y}$ = Reading Total Score



tics, Interpersonal Behavior, Balance, and Age were also important predictors. Children with high initial scores on Word Study Skills performed at the mean level even when their Word Meaning scores were low. Low Word Study Skills scores on the other hand were important predictors in the lowest levels of post test reading performance. Low problem ratings on the variables of Language and Thought and Interpersonal Behavior were predictive of higher reading scores than were high problem ratings on these variables. Problem ratings in General Characteristics, however, were inversely related to reading success when this variable was grouped with average initial Word Meaning scores and high Language and Thought problem ratings. Adequate initial performance in vocabulary skills and problems in the Language and Thought area appear to have outweighed the specific effects of the General Characteristics variable. High initial scores on Balance were predictive of successful reading performance when this variable was grouped with adequate intial Word Meaning scores. Low Balance scores grouped with low Word Meaning scores, on the other hand, were associated with post test reading performance one level below the total group mean. Age was an important predictive factor in the lower levels of post test reading performance. This variable was inversely related to reading performance when combined with low scores on Word Meaning, Word Study Skills, and low problem ratings on Interpersonal Behavior.

For the total sample's Perceptual Motor Total post test performance ten final subgroups accounted for 85.22 % of the variance (see table 17 and figure 13). Age and perceptual motor variables comprised the major predictive groups. The higher age groups were generally associated with higher post test perceptual motor performance, except when combined with low IQ. However the combination of lower age and high initial Total Perceptual Motor performance was predictive of post test perceptual motor performance above the group mean of 71.84. Within the lower levels of perceptual motor performance the low age and high initial perceptual motor scores was predictive of poor perceptual motor performance when Word Study Skills were low or when problem ratings in Interpersonal Behavior were high. The combination of low age and low initial level of total perceptual motor performance was the group which predicted the lowest level of post test perceptual motor performance. Perceptual Motor Match and Form Perception were also important predictors of post test total perceptual motor performance. Initial high

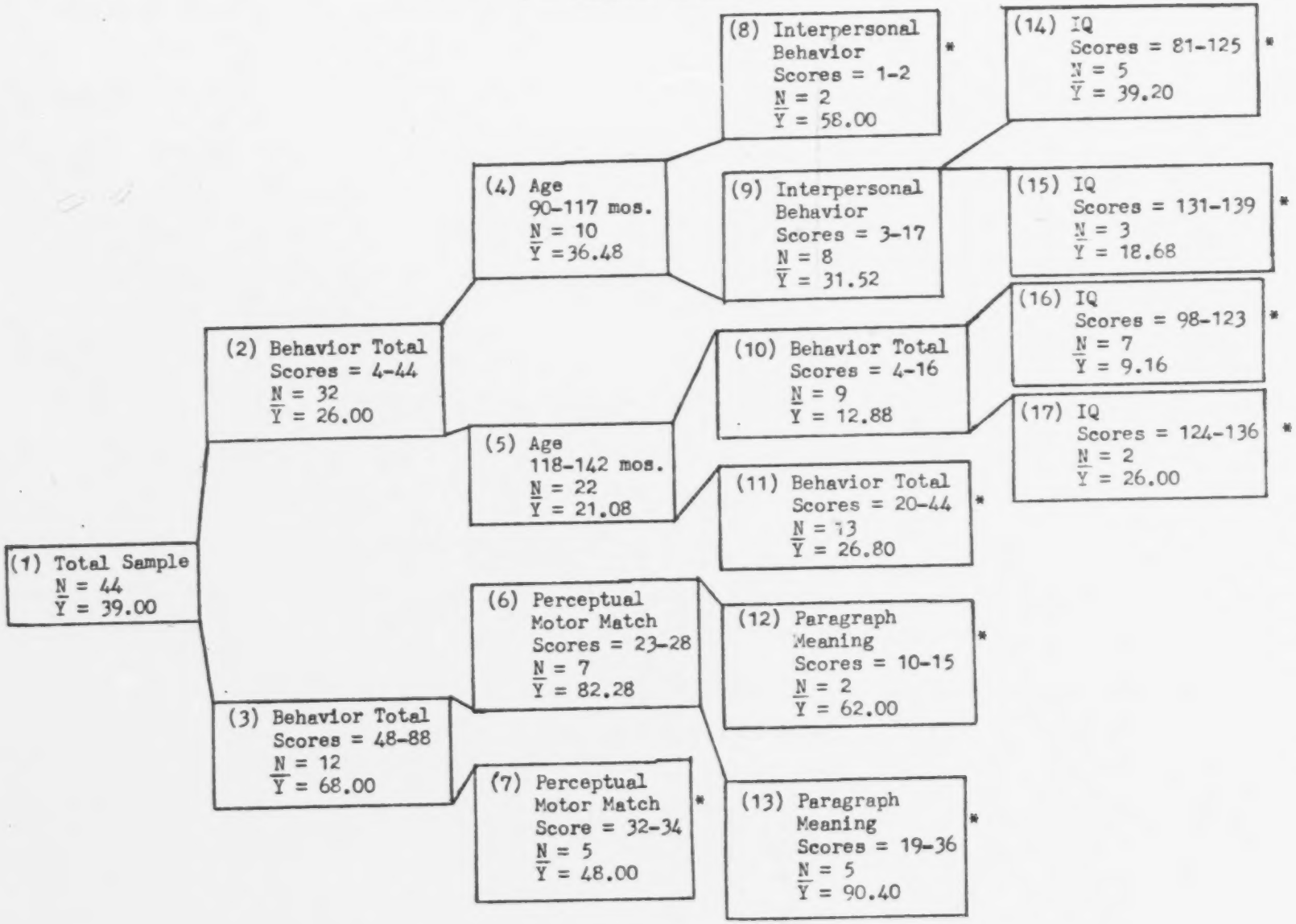
Table 17

AID Analysis, Total Sample, $\bar{Y}$ = Perceptual Motor Total

Group	Type	N	Mean Post Test Perceptual Motor Total Score	SD
13	Age - Very Low, Perceptual Motor Total - High, Interpersonal Behavior - Low, Perceptual Motor Match - High	1	78.00	.00
14	Age - High, IQ - High, Language & Thought - Low	8	78.00	1.00
19	Age - Low Average, Perceptual Motor Total - High, Interpersonal Behavior - Low, Word Study Skills - High	1	74.00	.00
17	Age - Very Low, Perceptual Motor Total - High, Interpersonal Behavior - Low, Perceptual Motor Match - Low, Form Perception - High	6	73.34	.94
15	Age - High, IQ - High, Language & Thought - Low	2	73.00	1.00
16	Age - Very Low, Perceptual Motor Total - Low, Interpersonal Behavior - Low, Perceptual Motor Match - Low, Form Perception - Low	8	71.50	1.66
10	Age - High, IQ - Low	2	70.00	2.00
18	Age - Low Average, Perceptual Motor Total - High, Interpersonal Behavior - Low, Word Study Skills - Low	7	68.86	1.46
7	Age - Low, Perceptual Motor Total - High, Interpersonal Behavior - High	4	65.00	3.32
4	Age - Low, Perceptual Motor Total - Low	5	63.60	3.44

Figure 14

Subgroups of Binary Splits - Total Group
$\bar{Y}$ = Behavior Total Score



scores on these variables were associated with better post test performance than were low pre test scores in these areas. Finally, low Language and Thought scores were associated with post test perceptual motor performance above the group mean.

Nine final subgroups accounted for 92.21 % of the variance in post test Behavior Total performance (see table 18 and figure 14). Behavior Total pre test scores were the main predictors of post test performance on this variable. Age was also an important variable with the higher age groups (118-142 mos.) generally being associated with lower behavior problem total scores. When the lower age level (90-117 mos.) was found in groups predicting lower post test problem behavior performance it was combined with high and average levels of IQ. Interpersonal Behavior was also an important predictor, but it had an inverse relationship to behavioral performance when it was found in combination with low inital problem behavior ratings and low age level. In the levels of non-successful behavioral post test performances Perceptual Motor Match and Paragraph Meaning emerged as important predictors. High initial scores on Perceptual Motor Match were predictive of lower behavior problem ratings than were low scores on this variable. On the other hand, high scores on Paragraph Meaning were predictive of higher behavior problem ratings than were low scores on this variable when Paragraph Meaning was found in combination with high initial Total Behavior problem ratings and poor Perceptual Motor Match performance.

Summary AID II Analysis

One of the outstanding findings from the automatic Interaction Detector analysis is that success on a given outcome variable is dependent largely on the child's initial level of performance on that variable or factors closely related to it. Treatment groups themselves did not emerge as important predictive factors in the analysis of the total sample. Rather the initial level of performance and simple age were the outstanding factors determining sucess and non-success. Simple chronological age was an especially important factor in post test perceptual motor total performance. For two groups, the control group and the total sample, age formed the major predictive groupings for successful and non-successful performance in this area. Age also played an important role in the prediction of total school behavior adjustment. For the

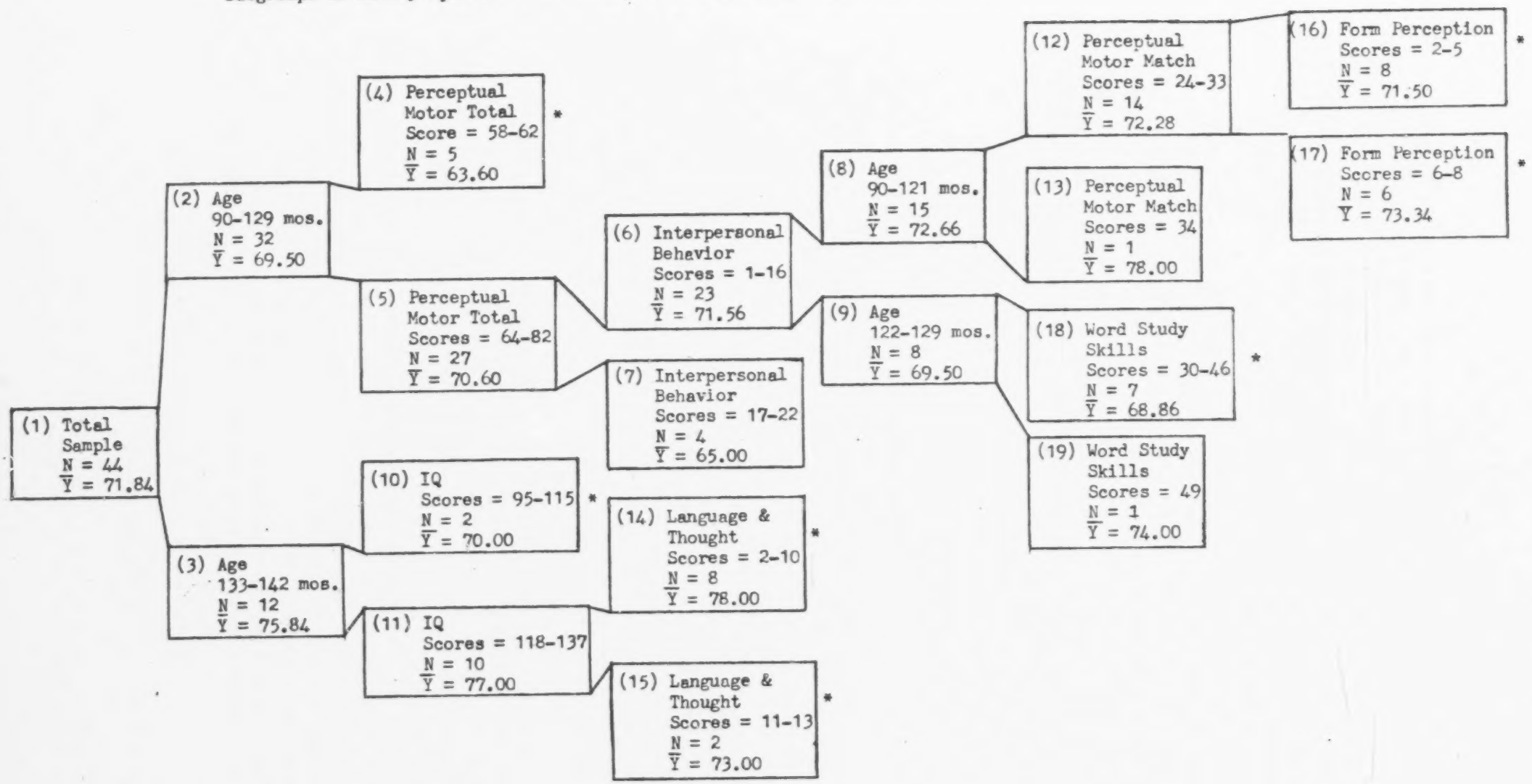
Table 18

AID Analysis, Total Sample, $\bar{Y}$ = Behavior Total

Group	Type	N	Mean Post Test Behavior Total Score	SD
16	Behavior Total - Very Low, Age - High, IQ - Average	7	9.16	5.60
15	Behavior Total - Low, Age - Low, Interpersonal Behavior - High, IQ - Very High	3	18.68	8.20
17	Behavior Total - Very Low, Age - High, IQ - High	2	26.00	6.00
11	Behavior Total - Low Average, Age - High	13	26.80	6.40
14	Behavior Total - Low, Age - Low, Interpersonal Behavior - High, IQ - Low	5	39.20	6.00
7	Behavior Total - High, Perceptual Motor Match - High	5	48.00	11.60
8	Behavior Total - Low, Age - Low, Interpersonal Behavior - Low	2	58.00	6.00
12	Behavior Total - High, Perceptual Motor Match - Low, Paragraph Meaning - Low	2	62.00	6.00
13	Behavior Total - High, Perceptual Motor Match - Low, Paragraph Meaning - High	5	90.40	4.80

Figure 13

Subgroups of Binary Splits - Total Group - $\overline{Y}$ = Perceptual Motor Total Scores



perceptual motor training group age was the main discriminant between success and non-success in school behavior. In the reading training group age also plays a major predictive function. In all of these groups higher age levels were associated with more successful performance in behavior adjustment, a finding which parallels the results of the multivariate analysis of covariance.

The relationships found between the perceptual motor and reading variables are also of special interest. First, in relation to the question of the effect of perceptual motor ability on reading performance it is important to note that perceptual motor variables were predictive of reading total performance only when they were combined with reading factors. Second, in two instances, one in the perceptual motor training group and one in the control group, perceptual motor performance actually had an inverse relationship to reading. Poor performance on Laterality and Balance was associated with higher reading scores than was high initial performance in these areas. Further, when a positive linear relationship was found between perceptual motor variables and reading performance the perceptual motor variables were not highly significant predictors. In the reading group, for example, low Laterality scores combined with low Word Study Skills did predict the lowest reading performance group. However, high Laterality scores were associated with reading performance below the mean of the total group. In the total sample analysis a similar finding occurred for Balance. This variable was a predictive factor when combined with Word Meaning, but high and low Balance scores discriminated only the groups just one level above and below the mean. Reading as well as behavioral and age variables were more important in discriminating the highest and lowest groups. An even more interesting finding is the predictive value of the reading variables for perceptual motor performance. This relationship was particularly strong in the reading training group where the reading comprehension variable of Paragraph Meaning outweighed the strong effect of perceptual motor and age variables and was the main discriminant of successful and non-successful performance. Low Paragraph Meaning scores predicted the actual score range of perceptual motor performance which has been identified as the point at which perceptual motor ability is supposedly at such a low level that it will have a detrimental effect on school achievement.

Indeed, it appears that the predictive functions are actually in the opposite direction. This finding however, is not an unusual one in view of the work of Elkind (1969) and Hershenson (1969) which demonstrates the guiding and controlling effect of linguistic and cognitive variables on perceptual development.

Finally, the AID analysis demonstrates the complex interaction of variance factors associated with levels of the outcome variables studied. These findings vividly illustrate the fallacy of setting up of treatment conditions in terms of an assumed simple one to one correspondance between a given etiological factor such as perceptual motor ability and problems in a performance area such as reading.

Correlational Analysis

As indicated in table 19 the Pearson Product Moment correlation coefficients followed the predictable pattern of showing high relationships of each of the reading, perceptual motor, and behavioral variables with one another and low or negative relationships with variables in other categories. Age had a higher correlation with Reading Total scores than Perceptual Motor Total scores, and was inversely related to high Behavior Total problem ratings. The perceptual motor variables showed only low or moderate correlation with the reading subtests and Form Perception had a low negative correlation with Paragraph Meaning and Reading Total. Finally, the behavior problem ratings were negatively correlated with the reading and perceptual motor variables.

IV. Conclusion

The conclusions from the study will be considered in terms of each of the four objectives stated in the introduction. The findings which relate to the main problem of determining the differential effectiveness of perceptual motor training and individualized remedial reading instruction on the reading achievement, perceptual motor development, and behavior adjustment are those of the multivariate analysis of covariance among the treatment conditions. The perceptual motor training had no significant effect on reading achievement, in fact this group performed more poorly in reading than either of the other two groups.

Table 19

Correlation Matrix among all Variables
for the Total Sample

	AGE	IQ	WM	PM	WSS	RT	L	D	PMM	BAL	PF	FP	PT	GC	LT	IAB	PB	IEB	BT
IQ	.25																		
WM	.71	.11																	
PM	.72	.15	.85																
WSS	.71	.30	.67	.69															
RT	.79	.21	.91	.94	.86														
L	.38	.40	.25	.24	.44	.34													
D	.64	.25	.45	.41	.56	.52	.49												
PMM	.42	.28	.27	.29	.37	.34	.47	.42											
BAL	.28	.12	.27	.30	.36	.34	.29	.36	.37										
PF	.15	-.02	.21	.16	.03	.14	.04	.004	.27	.26									
FP	.08	.02	.01	-.09	.07	-.01	.29	.20	.43	.24	.09								
PT	.54	.32	.38	.36	.51	.45	.69	.70	.87	.59	.26	.57							
GC	-.57	-.24	-.18	-.20	-.41	-.29	-.40	-.48	-.35	-.20	-.20	-.05	-.45						
LT	-.45	-.26	-.08	-.09	-.28	-.16	-.34	-.41	-.33	-.16	-.27	-.06	-.40	.86					
IAB	-.32	-.30	-.15	-.04	-.16	-.03	-.14	-.34	-.30	-.11	-.02	-.05	-.30	.62	.56				
PB	-.23	-.05	-.01	.05	-.13	-.02	-.25	-.20	-.33	-.18	-.42	-.05	-.33	.71	.83	.27			
IEB	-.44	-.26	-.02	-.10	-.33	-.17	-.22	-.47	-.16	-.17	-.01	-.04	-.30	.74	.76	.71	.53		
BT	-.49	-.26	-.05	-.10	-.32	-.18	-.33	-.45	-.34	-.20	-.21	-.06	-.42	.94	.94	.73	.78	.88	

KEY: WM-Word Meaning, PM-Paragraph Meaning, WSS-Word Study Skills, RT-Reading Total, L-Laterality, D-Directionality, PMM-Perceptual Motor Match, BAL-Balance, PF-Physical Fitness, FP-Form Perception, PT-Perceptual Total, GC-General Characteristics, LT-Language and Thought, IAB-Intrapersonal Behavior, PB-Problem Behavior, IEB-Interperonal Behavior, BT-Behavior Total

The reading treatment itself produced the highest post test reading mean, but the difference between the reading group and the other two groups was not significant. The six months duration of the reading training, then, did not appear to be long enough to bring about significant gains. These findings support Balow's (1965) study demonstrating that long term and continuous remedial reading procedures are necessary to help poor achievers in this area. The treatment group analysis for reading achievement also lend support to Balow's (1968) contention that remedial reading procedures and not perceptual motor training yield success in reading achievement.

Perceptual motor training was also not effective in bringing about significant changes in perceptual motor development itself. This finding is a more unusual result than that of the reading analysis in terms of previous research. These results do, however, support those of Roach (1966) which indicate that small group perceptual motor training may not be effective for children above 95 months. Roach, however, used only reading achievement as a criterion variable. The results of this study suggest that a similar situation exists for perceptual motor ability also. Another factor involved in this particular study is that the children were not severely handicapped in this area. The methods may be useful for children who exhibit more severe problems in the perceptual motor area. The results suggest that caution should be used in providing perceptual motor training for children above 90-95 months. Particular care should be given to assessing the degree of perceptual motor handicap with precise objective measurements which have been validated in terms of training outcomes.

The behavior adjustment analysis indicated that the reading and control training procedures were most effective in producing gains in this area. These results support the results of Glavin, Wherry, and Quay (1971) indicating that programs centering on and directly reinforcing academic achievement behavior in children are an effective means of producing behavior adjustment gains. The perceptual motor training group's significantly poorer performance on the school behavior variables does not support the notion that the playful non-academic atmosphere and simple attentional elements involved in these programs help children with their school adjustment and

learning problems.

Perceptual motor training, then, did not produce significant gains in reading achievement or behavior adjustment. Further it had no value for perceptual motor development for the children in the age group and ability level of this study. Individualized remedial reading instruction produced greatest gains in reading achievement and the academically oriented programs of the reading and control groups were associated with significant gains in behavior adjustment. In terms of the second objective of the study, analysis of the transfer effects of perceptual motor training on reading achievement, the results of this study give a rather definitive negative answer. The treatment condition comparisons clearly indicate that the type of training did not transfer to reading skills. The children in the perceptual motor group attained the lowest post test reading scores. Further, the AID analysis revealed that the perceptual motor variables predicted reading outcomes only when the perceptual motor factors were grouped with reading variables. Even then the relationship was a sporadic one with the perceptual motor variables being sometimes negatively and sometimes postively related to reading. In addition the correlational analysis indicates only low and negative relationships between the perceptual motor and reading variables. The very low and negative correlations attained between Form Perception and the reading variables shown in table 19 is of particular interest in regard to the transfer issue. Form Perception should be a predominant factor in reading ability. However, the correlation analysis of this subtest of the Roach and Kephart (1966) test which uses nonverbal stimuli did not support this notion. These results support evidence provided by Rosen (1966) that training in the perception of non-verbal stimuli such as those used in the Frostig Developmental Test of Visual Perception does not transfer to reading letters and words. These results suggest that if perceptual training is to have a transfer effect on reading it should involve the use of graphemes, letters, and words. Perceptual training systems such as those proposed by Elkind (1969) and Gibson (1970) in which verbal stimuli are predominant seem to be appropiate models since they have proved successful in helping children in general reading achievement, as well as word recognition and letter identification tasks.

However, the findings of the present study indicate that perceptual motor training in which non-semantic stimuli are used has no transfer effects on reading skills.

Aside from examining the value of specific teaching methods in themselves, the third objective of this study was to determine the characteristics of children likely to experience gain under a specific treatment condition. The interactions found in the multivariate analysis of covariance provide two specific answers to this question, first in regard to the age x treatment interaction for Paragraph Meaning the results suggest that success in this area is most likely to be achieved by older children recieving an individualized reading program. The same type of interaction suggests that perceptual motor training may be valuable in developing physical fitness in young children, but not as valuable as a general activity program such as the one provided in the control group. The results in regard to physical fitness must be examined further, however, because of the measurement limitations of the four point scale used to define physical fitness in this study.

The AID analysis provides broader suggestions for examining characteristics of children and their interactions with specific types of instructional programs. First, the findings from this analysis point out the importance of simple maturation and levels of readiness in the outcome variables for which a child is being given a particular type of intervention. Regardless of the type of intervention these factors appear to dominate the final results. Second, the strong predictive value of pre test characteristics specific to a given outcome variable suggests that specific training in a given area such as reading will transfer more directly to performance in that area. Reading variables dominated the groupings predictive of success or nonsuccess in reading performance. With few exceptions this pattern was also repeated for the other variables. Third, the complex nature of the interaction of the predictive variables and the differential effects of this interaction on outcome performance suggest the need for a broadly based instructional programs encompassing all of a given child's educational needs. A reading program should not be organized for a child without taking into account the behavioral and physical education needs he may have. Likewise, perceptual motor

programming should not be undertaken in isolation as a means of developing reading performance. Finally, the individual patterns associated with success and non-success within each treatment condition should be used as a general guide to an individualized analysis of children being considered for one of the types of instruction programs examined in the study rather than as an absolute predictive standard.

The fourth objective of this study was to examine the relationships among the variables in the population of children being studied. The correlational analysis revealed that the reading variables related highly with one another and had low and inverse relationships with the perceptual motor and behavioral variables. These findings support the conclusion of Olson (1966 a, 1966b) that perceptual motor variables do not relate significantly to reading performance. They are in disagreement with the work of Bryan (1964), Frostig, Maslow, Lefever, and Whittlesey (1964), Ismail and Gruber (1967), and Kephart (1958) in which correlational techniques are used to demonstrate the notion that perceptual motor abilities as measured in this study are essential to reading and school achievement in general. The wide discrepancies in the conclusions based on the use of the same technique which yields almost identical correlation coefficients for authors who make opposing conclustions from this information suggest that the use of simple correlational techniques is not a useful tool for studying the problems of perceptual motor development and reading abilities. The complex interactions among these variables found in the AID analysis lend support to this argument. The choice of statistical techniques is not a trivial problem in this area because the questionable correlational relationships between perceptual motor and reading variables has been the prime basis for defining clinical entities such as "dyslexia". The labelling process involved in bringing such syndromes into existence then provides the foundations for possibly irrelevant and useless educational activities.

Finally, the total analyses suggest that in terms of the main problem addressed in this investigation, the perceptual motor training techniques examined here are in fact one of the "panaceas" referred to by Kass (1969), and are particularly fruitless and unfortunate approaches for the remediation of reading problems. This study suggests that for both the child's development in problem

reading areas and behavior adjustment, the more arduous road of long term individualized remedial reading instruction is the answer.

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Appendix A

School Behavior Profile

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The School Behavior Profile is a 68 item experimental scale on which the classroom teacher rates a child's behavior in five areas -- general characteristics, language and thought, intrapersonal behavior, interpersonal behavior, and problem behavior. The School Behavior Profile is not a test which produces a score to be compared against established norms. It is a set of terms which, when checked for a specific child, provide a description of the child's behavior in school as judged by the teacher. Teachers are instructed to check one of four ratings according to the frequency with which the child shows in school the particular behavior reflected by the item rated. The four ratings possible are Almost Always, Often, Seldom, Almost Never. Scoring may then be done using a four point scale with weights assigned each rating, or by collapsing the ratings into a dichotomous scale reflecting simply the presence or absence of the behavior.

The School Behavior Profile was developed from an original pool of nearly 200 terms selected from a variety of checklists and scales for the assessment of deviant behavior. Terms that were identical, highly similar, or not relevant were eliminated leaving 84 terms that appeared to reflect behavior which could be observed by teachers in the course of their regular classroom duties. These 84 terms were then cast into words that would be as much as possible unambiguous, understandable, and representative of observable bits of behavior. The 84 items were evaluated by four psychologists and five physicians. Based on their evaluations a number of items were revised or dropped.

A 73 item form was then subjected to trial in a number of elementary schools in which approximately 15 different teachers each rated several children. Additional changes were made on the basis of the teachers' critiques, resulting in 68 items with four possible ratings for each item as described above.

SCHOOL BEHAVIOR PROFILE

Bruce Balow
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Directions to the Teacher: The items below are descriptive terms that apply to many children. Each item can be answered from your observations of the child in question; do not try to compare the child to other children.

Please circle the letter or letters for "Almost Always", "Often", "Seldom", or "Almost Never" according to the frequency with which the child shows the particular behavior in school.

A. GENERAL CHARACTERISTICS		TEACHER COMMENTS
1. Neat, clean personal appearance	AA O S AN	
2. For Boys: effeminate behavior	AA O S AN	
For Girls: tomboy behavior	AA O S AN	
3. Sluggishness, lethargy	AA O S AN	
4. Sucks thumb or finger	AA O S AN	
5. Bites nails or fingers	AA O S AN	
6. Clumsiness, awkwardness	AA O S AN	
7. Nervousness, jitteriness, jumpiness	AA O S AN	
8. Hyperactivity; hardly ever still	AA O S AN	
9. Twitches, mannerisms or tics of the face or body	AA O S AN	
10. Shows odd movements such as flapping of arms, twisting movements of hands in front of face or facial grimacing	AA O S AN	

B. LANGUAGE AND THOUGHT

		TEACHER COMMENTS
11.	Doesn't speak; uses only grunts or noises to communicate	AA O S AN
12.	Although able to speak, uses mime or demonstration instead	AA O S AN
13.	Speech unintelligible	AA O S AN
14.	Expresses ideas poorly; difficult to follow train of thought	AA O S AN
15.	Stutters or stammers	AA O S AN
16.	Speech articulation difficulty, (e.g., omits sounds, substitutes sounds)	AA O S AN
17.	Talkative, chatterbox	AA O S AN
18.	Shows rapid thinking	AA O S AN
19.	Short attention span	AA O S AN
20.	Distracted by sights or sounds in classroom	AA O S AN
21.	Distracted from within self (e.g., petit mal like lapses, shifts of activity or verbal content without apparent external cause)	AA O S AN
22.	Dislikes school work	AA O S AN
23.	Preoccupied with a fixed idea (e.g., constantly pretending to be a train or always drawing the same things over long periods)	AA O S AN
24.	Preoccupied with certain aspects of things (e.g., their shininess, texture of color)	AA O S AN

C. INTRAPERSONAL BEHAVIOR

TEACHER COMMENTS

25.	Depressed	AA	O	S	AN
26.	Hypersensitivity; feelings	AA	O	S	AN
27.	Crying over minor annoyances and hurts	AA	O	S	AN
28.	Self-consciousness; easily embarrassed	AA	O	S	AN
29.	Daydreaming	AA	O	S	AN
30.	Anxiety, general fearfulness	AA	O	S	AN
31.	Trusting, trustful	AA	O	S	AN
32.	Reticent or secretive	AA	O	S	AN
33.	Fussy or over-particular	AA	O	S	AN
34.	Examines things in odd ways (e.g., by sniffing or biting them)	AA	O	S	AN

D. PROBLEM BEHAVIOR

35.	Fights with other children	AA	O	S	AN
36.	Bullie other children	AA	O	S	AN
37.	Profane language; swearing, cursing	AA	O	S	AN
38.	Temper tantrums (complete loss of temper with shouting, angry movements, etc.)	AA	O	S	AN
39	Tells lies	AA	O	S	AN
40.	Destructive of property (his own or others)	AA	O	S	AN
41.	Daredevil actions	AA	O	S	AN
42.	Boisterousness, rowdiness	AA	O	S	AN
43.	Steals	AA	O	S	AN
44.	Disobedience; does not accept adult control	AA	O	S	AN

TEACHER COMMENTS

45.	Disruptiveness; tendency to annoy and bother others	AA	O	S	AN
46.	Acts impulsively with little forethought	AA	O	S	AN
47.	Irresponsibility, undependability	AA	O	S	AN

E. INTERPERSONAL BEHAVIOR

48.	Formal, controlled responses to others; "adult-like"	AA	O	S	AN
49.	Prefers to play with older children	AA	O	S	AN
50.	Prefers to play with younger children	AA	O	S	AN
51.	Social withdrawal, preference for solitary activities	AA	O	S	AN
52.	Uncooperative in group situations	AA	O	S	AN
53.	Inattentive to what others say	AA	O	S	AN
54.	Attention-seeking, "show-off" behavior	AA	O	S	AN
55.	Self-assertive; seeks leadership role	AA	O	S	AN
56.	Critical of others	AA	O	S	AN
57.	Negativistic and contrary	AA	O	S	AN
58.	Irritability; hot-tempered, easily aroused to anger	AA	O	S	AN
59.	Jealousy over attention paid other children	AA	O	S	AN
60.	Avoids looking at others directly; looks past or through them	AA	O	S	AN
61.	Passivity, suggestibility; easily led	AA	O	S	AN
62.	Sympathetic to others	AA	O	S	AN

F. ADDITIONS

TEACHER COMMENTS

63.	Away from his desk without permission	AA O S AN
64.	Talking out of order	AA O S AN
65.	Does messy work	AA O S AN
66.	Tires easily	AA O S AN
67.	Generally unnoticed by others	AA O S AN
68.	Tattles	AA O S AN

Appendix B

TEACHER LOG
READING GROUP

Monday, November 30 - Friday, December 4

SUBJECT 21, Instructional Group II. Areas needing emphasis: 1) Word Structural Analysis - medial sounds, short vowels, consonant digraphs, accents & syllables 2) Comprehension 3) Vocabulary.

	ABILITY	ACTIVITY
11/30	Comprehension	Read Teacher composed story about his own activities. Answer comprehension questions.
12/1	Structural Analysis-Blends-Vocabulary-Comprehension Visual Memory	Game-Quizmo Sentence construction Game-Concentration
12/2	Comprehension - Vocabulary	Sight reading
12/3	absent-illness	
12/4	absent-illness	

SUBJECT 22, Instructional Group II. Areas needing emphasis: 1) Word Structural Analysis - medial sounds, accents & syllabication 2) Comprehension 3) Vocabulary.

	ABILITY	ACTIVITY
11/30	Word Structural Analysis	Practice and review of beginning, blends ch, th, sh, wh, SRA Phonics survey
12/1	Word Structural Analysis-Blends-Comprehension-Vocabulary, Visual Memory	Game-Quizmo Sentence Construction Game-Concentration
12/2	Word Structural Analysis Sight Reading	Development and Practice oa, ow, oe sounds, Sentence Construction Game
12/3	Word Structural Analysis	Medial vowels-review and practice oa, ai sounds
12/4	Sight Reading, Vocabulary, Comprehension	"Reading Bee" - recognizing words, using them in sentences

SUBJECT 23, Instructional Group II. Areas needing emphasis: 1) Word Structural Analysis-ending sounds, short vowels 2) Comprehension 3) Vocabulary

	ABILITY	ACTIVITY
11/30	Comprehension	Sequencing and answering compre-

		hension questions from a Teacher composed story about the child's activities
	Word Structural Analysis	Seat work, review of short vowels
12/1	Comprehension - Vocabulary	Sentence construction
	Word Study Skills	Ending sounds-review, practice beginning blends-game "Quizmo"
12/2	Sight Reading	Game played by making sentences from phrases constructed by students
12/3	Comprehension	Reading a story followed by comprehension questions
	Visual Memory	Game-Concentration
12/4	Comprehension	Continue reading and work on story, Constructing sentences

SUBJECT 24, Instructional Group II. Areas needing emphasis: 1) Word Structural Analysis - beginning digraphs 2) Comprehension 3) Vocabulary.

	ABILITY	ACTIVITY
11/30	Word Structural Analysis	Beginning and ending blends-th, sh, ch, wh, - SRA Phonics survey
12/1	Word Structural Analysis	Blends-game, Quizmo
12/2	Sight Reading, Vocabulary	Sentence construction
12/3	Vocabulary and Visual Memory Skills	Game-Concentration
12/4	Comprehension, Vocabulary	Constructing sentences from phrases made up by students

SUBJECT 25, Instructional Group II. Areas needing emphasis: 1) Word Structural Analysis: medial digraphs, accents and syllabication.

	ABILITY	ACTIVITY
11/30	Comprehension	Sequencing and answering comprehension questions from a Teacher composed story of child's activities
	Word Structural Analysis	Medial digraphs, seat work

12/1	Sight Reading, Vocabulary Visual Memory Word Structural Analysis and Vocabulary	Sentence construction Game-Concentration Quizmo game using blends and blend words
12/2	Sight Reading, Comprehension, Vocabulary	Sentence construction from phrases made by the teacher
12/3	Sight Reading, Comprehension, Vocabulary Visual Memory	Sentence construction Game-Concentration
12/4	Comprehension	Original sentence construction and meaning analysis of phrases

SUBJECT 26, Instructional Group II. Areas needing special emphasis: 1) Word Structural Analysis-medial digraphs 2) Comprehension.

	ABILITY	ACTIVITY
11/30	Comprehension, Vocabulary, Medial digraphs	SRA Reading Laboratory
12/1	Word Structural Analysis Comprehension Visual Memory-Phrases	Homophones-Development, Practice Sentence Construction Game-Concentration
12/2	Word Structural Analysis	Identifying Visual Word Elements in sentences constructed yesterday
12/3	Vocabulary Visual Memory	Development and review of new words used in week's sentence construction activity Game-Concentration
12/4	Word Structural Analysis	Review blends; ch, sh, th, wh SRA Phonics survey

SUBJECT 27, Instructional Group II. Areas needing special emphasis: 1) Word Structural Analysis-medial vowels, syllabication, accents 2) Vocabulary.

	ABILITY	ACTIVITY
11/30	Comprehension, Vocabulary, Medial digraphs	SRA Reading Laboratory
12/1	Comprehension, Vocabulary, Medial digraphs	SRA Reading Laboratory

12/2	Visual Structural Analysis, Vocabulary	Crossword Puzzle, Dictionary Practice
12/3	Visual Word Analysis, Vocabulary	"Probe" game
12/4	Comprehension, Vocabulary, Syllabication	SRA Reading Laboratory, Crossword Puzzle, Dictionary Practice

TEACHER'S LOG
READING GROUP
November 30 - December 4

SUBJECT 28, Instructional Group I. Areas needing special emphasis: Vocabulary and Comprehension.

	ABILITY	ACTIVITY
11/30	Inference, Meaning, interpretation	Limericks
	Medial digraphs, vocabulary	Homophones
12/1	Comprehension, Vocabulary Word Structural Analysis	SRA Laboratory
12/2	Comprehension, Vocabulary Word Structural Analysis	SRA Laboratory Concentration
12/3	Word Analysis, Vocabulary	"Probe" (word game)
12/4	Word Analysis, Vocabulary	"Probe"

SUBJECT 29, Instructional Group I. Areas needing special emphasis: 1. Word Structural Analysis-medial sounds 2. Comprehension

	ABILITY	ACTIVITY
11/30	Absent	
12/1	Comprehension, Vocabulary Word Structural Analysis	SRA Reading Laboratory
12/2	Visual Word Analysis	Crossword Puzzles
12/3	Visual Word Analysis	Crossword Puzzles
12/4	Visual Word Analysis	Crossword Puzzles

SUBJECT 210, Instructional Group I. Areas needing special emphasis: 1. Comprehension 2. Word Structural Analysis-Syllabication.

	ABILITY	ACTIVITY
11/30	Syllabication	Developmental lesson and worksheet
12/1	Comprehension, Word Meaning	SRA Reading Laboratory. Word definitions-Dictionary work
12/2	Vocabulary	Scrabble
12/3	Vocabulary	Scrabble

12/4	Comprehension, Vocabulary, Word Study-Syllabication	SRA Reading Laboratory

SUBJECT 211, Instructional Group I. Areas needing special emphasis: 1. Comprehension 2. Vocabulary

	ABILITY	ACTIVITY
11/30	Comprehension, Vocabulary, Word Study	SRA Reading Laboratory
12/1	Comprehension, Vocabulary, Word Study	SRA Reading Laboratory
12/2	Word Analysis, Vocabulary	Word game-"Probe"
12/3	Comprehension	Limericks. Independent reading
12/4	Vocabulary, Comprehension	Crossword Puzzle

SUBJECT 212, Instructional Group I. Areas needing special emphasis: 1. Word Structural Analysis-medial sounds, syllabication 2. Vocabulary

	ABILITY	ACTIVITY
11/30	Comprehension, Vocabulary, Word Structural Analysis-Medial sounds and syllabication	SRA Reading Laboratory Short story "Mama and The Occasion"
12/1	Absent	
12/2	Comprehension	Independent reading
12/3	Visual Word Analysis-Vocabulary	Word game-"Probe"
12/4	Vocabulary, Comprehension	Sentence Construction

SUBJECT 213, Instructional Group I. Areas needing special emphasis: Comprehension

	ABILITY	ACTIVITY
11/30	Comprehension, Vocabulary, Word Study	SRA Reading Laboratory
12/1	Visual Word Analysis, Vocabulary	Crossword Puzzles

12/2	Comprehension	Independent reading for book report
12/3	Absent	
12/4	Comprehension	Sentence construction

SUBJECT 214, Instructional Group I. Areas needing special emphasis: 1. Vocabulary 2. Word Structural Analysis-Syllabication.

	ABILITY	ACTIVITY
11/30	Comprehension, Vocabulary, Word Study	SRA Reading Laboratory
12/1	Vocabulary	Dictionary work
12/2	Vocabulary	Synonyms- Definitions
12/3	Syllabication	Developmental lesson and work sheet
12/4	Comprehension - Vocabulary	Poetry reading and interpretation

SUBJECT 215, Instructional Group I. Areas needing special emphasis: 1. Comprehension 2. Vocabulary 3. Word Structural Analysis-Syllabication

	ABILITY	ACTIVITY
11/30	Comprehension, Vocabulary, Word Study	SRA Reading Laboratory
12/1	Comprehension, Visual Word Analysis, Vocabulary	SRA Reading Laboratory, Crossword Puzzle-construction
12/2	Comprehension, vocabulary	Independent Reading
12/3	Absent	
12/4	Visual Word Analysis-Vocabulary	Completed crossword puzzle

TEACHER'S LOG

PERCEPTUAL MOTOR GROUP
November 30 - December 4

SUBJECT 31, Instructional Group II. Deficit areas: 1) Laterality 2) Directionality 3) Perceptual Motor Match-especially ocular pursuits.

	ABILITY	ACTIVITY
11/30	1. Ocular Pursuits 2. Perceptual Motor Match	Eye tracking Chalkboard exercise, circles, squares, cursive letters, dot to dot matching, designs, (seatwork)
12/1	1. Ocular Pursuits 2. Perceptual Motor Match	Eye tracking Chalkboard, tracing, cutting, posting geometric designs
12/2	Laterality, directionality, coordination & balance	Ball control movements - games
12/3	Absent (illness)	
12/4	1. Ocular pursuits 2. Directionality 3. Directionality, laterality, balance	Eye tracking Obstacle course games Ball control movements

SUBJECT 32. Instructional Group II. Deficit areas: 1.) Laterality 2) Directionality 3) Perceptual Motor-ocular pursuit (Right eye)

	ABILITY	ACTIVITY
11/30	1. Ocular Pursuits 2. Perceptual Motor Match	Eye tracking Chalkboard exercise, tracing, cutting, posting, geometric designs
12/1	1. Ocular Pursuits 2. Perceptual Motor Match	Eye tracking Chalkboard, dot to dot, matching designs
12/2	Laterality, directionality, balance	Ball control movements
12/3	Laterality, directionality, balance	Ball control movements
12/4	Laterality, directionality, balance	Obstacle course, ball control movements

SUBJECT 33, Instructional Group II. Deficit areas: 1) Laterality 2) Directionality 3) Perceptual Motor Match-ocular pursuits.

	ABILITY	ACTIVITY
11/30	1. Ocular Pursuits 2. Perceptual Motor Match	Eye tracking Chalkboard exercise, tracing, cutting, posting geometric designs
12/1	1. Ocular Pursuits 2. Perceptual Motor Match	Eye tracking Chalkboard, dot to dot, matching designs
12/2	Laterality, directionality balance	Ball control movements
12/3	Laterality, directionality balance	Ball control movements
12/4	Laterality, directionality balance	Obstacle course, ball control movements

SUBJECT 34, Instructional Group II. Deficit areas: 1) Perceptual Motor Match-Ocular Pursuits 2) Form Perceptual 3)Directionality 4) Laterality

	ABILITY	ACTIVITY
11/30	1. Ocular Pursuits 2. Form Perception 3. Perceptual Motor Match	Eye tracking Matching geometric designs Cutting, posting, tracing designs, chalkboard exercises
12/1	1. Ocular Pursuits 2. Form Perception 3. Perceptual Motor Match	Eye tracking Match lined designs Copying dot to dot lined designs, chalkboard exercises
12/2	Laterality, directionality	Ball control movements
12/3	Laterality, directionality	Ball control movements
12/4	Laterality, directionality	Ball control movements, obstacle course

SUBJECT 35, Instructional Group II. Deficit areas: 1) Directionality 2) Form Perception 3) Advanced Balance 4) Perceptual Motor Match

	ABILITY	ACTIVITY
11/30	Form Perception	Eye tracking, matching geometric designs

	Perceptual Motor Match	Tracing, cutting, posting geometric designs, chalkboard exercise
12/1	Form Perception Perceptual Motor Match	Matching geometric designs dot to dot lined matching designs
12/2	Directionality, Balance	Ball control techniques
12/3	Directionality, Balance	Ball control techniques, obstacle course
12/4	Directionality, Balance	Ball control techniques, obstacle course games

SUBJECT 36, Instructional Group II. Deficit areas: 1) Ocular Pursuits 2) Balance (advanced) 3) Laterality

	ABILITY	ACTIVITY
11/30	Balance	Balance Board exercises, Ball stunts, animal walks-wheelborrow
12/1	Balance	Balance Board stunts
12/2	Laterality, Balance	Ball control techniques
12/3	Laterality, Balance, Directionality	Ball control techniques, obstacle course
12/4	Laterality, Balance, Directionality	Ball control techniques, obstacle course

SUBJECT 37, Instructional Group I. Deficit areas: 1) Perceptual Motor Match, Ocular Pursuits 2) Laterality

	ABILITY	ACTIVITY
11/30	Perceptual Motor Match	Matching, tracing, cutting, posting geometric designs
12/1	Perceptual Motor Match	Dot to dot matching lined designs
12/2	Laterality, Directionality	Ball control movements
12/3	Laterality, Directionality	Ball control movements
12/4	Laterality, Directionality	Ball control movements, obstacle course

SUBJECT 38, Instructional Group I. Deficit areas: 1) Form Perception 2) Perceptual Motor Match-Ocular Pursuits 3) Balance 4) Directionality

	ABILITY	ACTIVITY
11/30	Form Perception Perceptual Motor Match	Matching designs Tracing, cutting, posting geometric designs
12/1	Form Perception Percpetual Motor Match	Matching designs Dot to dot lined design matches

12/2	Balance, Directionality	Ball control techniques
12/3	Balance, Directionality	Ball control techniques, obstacle course
12/4	Balance, Directionality	Ball control techniques, obstacle course

SUBJECT 39, Instructional Group II. Deficit areas: 1) Laterality 2) Perceptual Motor Match

	ABILITY	ACTIVITY
11/30	Laterality, Directionality	Balance board techniques stunts
12/1	Laterality, Directionality	Balance board stunts
12/2	Laterality, Directionality	Ball control techniques
12/3	Laterality, Directionality	Ball control techniques, obstacle course
12/4	Laterality, Directionality	Ball control techniques, obstacle course

SUBJECT 310, Instructional Group II. Deficit areas: 1) Perceptual Motor Match 2) Form Perception 3) Balance-directionality (advanced)

	ABILITY	ACTIVITY
11/30	Balance, Directionality	Balance board technique stunts
12/1	Balance, Directionality	Balance board stunts
12/2	Balance, Directionality	Ball control techniques
12/3	Balance, Directionality	Ball control techniques, obstacle course
12/4	Balance, Directionality	Ball control techniques, obstacle course

SUBJECT 311, Instructional Group II. Deficit areas: 1) Perceptual Motor Match 2) Laterality

	ABILITY	ACTIVITY
11/30	Laterality, Directionality	Balance board stunts
12/1	Laterality, Directionality	Balance board stunts
12/2	Laterality, Directionality	Ball control techniques
12/3	Laterality, Directionality	Ball control techniques, obstacle course
12/4	Laterality, Directionality	Ball control techniques, obstacle course

SUBJECT 312, Instructional Group II. Deficit areas: 1) Form Perception 2) Perceptual Motor Match 3) Laterality 4) Directionality

	ABILITY	ACTIVITY

11/30	Laterality, Directionality	Balance board stunts
12/1	Laterality, Directionality	Balance board stunts
12/2	Laterality, Directionality	Ball control techniques
12/3	Laterality, Directionality	Ball control techniques, obstacle course
12/4	Laterality, Directionality	Ball control techniques, obstacle course

SUBJECT 313, Instructional Group II. Deficit areas: 1) Balance 2) Form Perception 3) Perceptual Motor Match-Ocular Pursuits

	ABILITY	ACTIVITY
11/30	Balance	Balance board stunts
12/1	Laterality, Directionality	Balance board stunts
12/2	Laterality, Directionality	Ball control techniques
12/3	Laterality, Directionality	Ball control techniques, obstacle course
12/4	Laterality, Directionality	Ball control techniques, obstacle course

SUBJECT 314, Instructional Group II. Deficit areas: 1) Form Perception 2) Perceptual Motor Match 3) Balance

	ABILITY	ACTIVITY
11/30	Balance	Balance board stunts
12/1	Laterality, Directionality	Balance board stunts
12/2	Laterality, Directionality	Ball control techniques
12/3	Laterality, Directionality	Ball control techniques, obstacle course
12/4	Laterality, Directionality	Ball control techniques, obstacle course

SUBJECT 315, Instructional Group II. Deficit areas: 1) Perceptual Motor Match 2) Laterality

	ABILITY	ACTIVITY
11/30	Laterality, Directionality	Balance board stunts
12/1	Laterality, Directionality	Balance board stunts
12/2	Laterality, Directionality	Ball control techniques
12/3	Laterality, Directionality	Ball control techniques, obstacle course
12/4	Laterality, Directionality	Ball control techniques, obstacle course

SUBJECT 316, Instructional Group II. Deficit areas: 1) Perceptual Motor Match-Ocular Pursuits 2) Balance 3) Laterality

Teacher's Log-Perceptual Motor Group
November 30-December 4
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	ABILITY	ACTIVITY
11/30	Balance, Laterality	Balance board stunts
12/1	Laterality, Directionality	Balance board stunts
12/2	Laterality, Directionality	Ball control techniques
12/3	Laterality, Directionality	Ball control techniques, obstacle course
12/4	Laterality, Directionality	Ball control techniques, obstacle course

TEACHER'S LOG
Placebo Control Group
November 30 - December 4

During this week the children in this group completed a unit on children of other lands and began a unit on crafts. The main follow up activity for the "Children of Other Lands" unit, making a cartoon story of themselves living in one of the countries studied, was used because of its relation to a previous unit, "Animation as a Medium".

11/30 Movie on Eskimo Children and Discussion

12/1 Beginning of project of drawing a cartoon story of themselves living in one of the countries they had studied during this unit

12/2 Continuation of Cartoon Story

12/3 Continuation of Cartoon Story

12/4 Began Crafts Unit. First topic: "Paper Construction". Children saw two short movies: Paper Sculpture and Paper in the Pound. Discussion followed of the techniques employed and projects for making paper objects discussed in the film.

Appendix C

Pre and Post Test Means and Standard Deviations
for all Variables

Test	Treatment Group					
	PERCEPTUAL MOTOR		READING		CONTROL	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
			WORD MEANING			
Pre	18.19	6.88	18.86	10.60	21.00	8.03
Post	22.63	5.94	24.43	8.00	23.50	6.24
			PARAGRAPH MEANING			
Pre	30.19	9.19	29.00	14.95	30.79	15.12
Post	33.94	8.04	34.21	12.18	34.71	9.32
			WORD STUDY SKILLS			
Pre	35.31	9.03	37.93	12.37	35.71	10.29
Post	36.94	10.88	42.57	9.01	38.07	10.44
			READING TOTAL			
Pre	83.69	20.14	85.79	36.62	87.50	30.62
Post	93.25	21.13	101.21	26.37	96.29	20.95
			LATERALITY			
Pre	5.94	1.64	6.50	1.18	6.71	.88
Post	6.25	1.30	6.43	1.12	6.86	.83
			DIRECTIONALITY			
Pre	17.00	2.32	16.86	1.73	17.21	1.47
Post	17.13	2.12	18.14	1.46	17.86	1.60
			PERCEPTUAL MOTOR MATCH			
Pre	29.38	3.30	29.86	3.00	30.21	3.03
Post	27.94	2.61	28.00	3.16	26.86	3.44
			BALANCE			
Pre	10.75	.97	10.00	1.51	10.00	.93
Post	10.69	.92	10.36	.61	10.36	1.50

Test	PERCEPTUAL MOTOR $\bar{X}$	SD	READING $\bar{X}$	SD	CONTROL $\bar{X}$	SD
			PHYSICAL FITNESS			
Pre	3.94	.24	3.86	.35	3.86	.35
Post	3.93	.56	3.86	.35	4.00	.00
			FORM PERCEPTION			
Pre	5.13	1.32	5.07	1.58	5.21	.86
Post	5.63	1.05	5.57	1.24	5.57	.10
			PERCEPTUAL MOTOR TOTAL			
Pre	72.13	7.17	72.14	7.05	73.21	4.93
Post	71.69	4.30	72.36	5.86	71.50	5.01
			GENERAL CHARACTERISTICS			
Pre	9.31	7.26	9.43	6.54	9.29	7.02
Post	10.31	9.17	8.14	4.34	9.64	8.55
			LANGUAGE and THOUGHT			
Pre	7.44	5.07	7.86	4.05	8.50	5.18
Post	8.75	4.75	7.14	2.20	8.14	6.03
			INTRAPERSONAL BEHAVIOR			
Pre	4.69	4.15	5.21	4.07	6.71	4.88
Post	6.13	5.36	6.64	3.46	5.93	5.02
			PROBLEM BEHAVIOR			
Pre	4.25	4.68	5.00	4.07	4.14	5.64
Post	5.81	5.76	5.07	2.87	5.21	5.63
			INTERPERSONAL BEHAVIOR			
Pre	8.56	5.67	10.29	4.76	9.64	5.41
Post	10.63	6.32	9.64	4.82	9.43	5.75
			BEHAVIOR TOTAL			
Pre	34.25	24.38	37.79	19.59	38.29	23.29
Post	41.63	28.91	36.64	14.10	38.36	27.67